BANGALORE WATER SUPPLY AND SEWERAGE BOARD

9th Floor, Cauvery Bhavan "D" Block,
K.G. Road, Bangalore 560009

Tender Document
of

Tender for Supply, Design, Implementation, Operations & Maintenance of LAN & Wireless LAN Infrastructure at BWSSB

(Through Karnataka Public Procurement Portal only)
https://www.kppp.karnataka.gov.in

Office of the Chief Engineer (Design & QA)
BANGALORE WATER SUPPLY & SEWERAGE BOARD
9th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009
Telephone – 080-22945340

NAME OF THE WORK & TENDER REFERENCE :	:	**Supply, Design, Implementation, Operations & Maintenance of LAN & Wireless LAN Infrastructure at BWSSB** No.: BWSSB/CE(D&QA)/ACE/TA/3069/2025-26 Dated: 28.10.2025	
TENDER PERIOD:	:	From: 30.10.2025	To: 18.11.2025
LAST DATE AND TIME FOR RECEIPT OF TENDERS	:	18.11.2025 upto16:00 hrs	
TIME AND DATE OF OPENING OF TECHNICAL TENDERS		19.11.2025 at 16:00 hrs	
PLACE OF OPENING OF TECHNICAL TENDERS	:	Office of the Chief Engineer (D&QA) Bangalore Water Supply & Sewerage Board 9th floor, Cauvery Bhavan, K.G.Road, Bangalore -560009	
TIME AND DATE OF OPENING OF PRICE TENDERS	:	Will be intimated to the Qualified Tenderers.	
PLACE OF OPENING OF PRICE TENDER	:	Will be intimated to the Qualified Tenderers	
ADDRESS FOR COMMUNICATION	:	Office of the Chief Engineer (D & QA) Bangalore Water Supply & Sewerage Board 9th floor, Cauvery Bhavan, K.G.Road, Bangalore -560009	

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD

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Bangalore -560009

Website **www.kppp.karnataka.govt.in** |Telephone: 080- 22945253

INVITATION FOR TENDER (IFT)

(Through KPP Portal Only)

SECTION 1:

IFT No.: BWSSB/CE(D&QA)/ACE/ TA /3069/2025-26
Dt:28.10.2025.

1. The Chief Engineer(D & QA) invites tenders from eligible tenderers, towards the **Supply, Design, Implementation, Operations & Maintenance of LAN & Wireless LAN Infrastructure at BWSSB** detailed in the Table below. Two Cover Tender procedure as per Rule28 of the KTPP Act shall be followed. The Tenders are required to submit two separate sealed covers, one containing the Earnest money deposit and the details of their capability to undertake the tender (as detailed in ITT Clause 3and 6), which will be opened first and the second cover containing the price tender which will be opened only if the Tenderer is found to be qualified to execute the tendered works. The Tenderers are advised to note the minimum qualification criteria specified in Clause 3 of the Instructions to Tenderers to qualify for award of the contract.

2. Tender documents may be downloaded through the kpp-procurement website www.kppp.karnataka.gov.in from **30.10.2025** to **18.11.2025** on payment of a non-refundable fee indicated in the Table below, using any of these forms of payments: OTC,NEFT, DEBIT CARD, and CREDIT CARD through KPP Portal only. Interested Tenderers may obtain further information at the Office of KPP. Tenderers will be issued a password and authorized for accessing the tender document on the website with URL: www.kppp.karnataka.gov.in

3. Tenders must be accompanied by earnest money deposit specified for the work in the Table below. Earnest money deposit will have to be in any one of the forms as specified in the Tender document and shall have to be valid for 45 days beyond the validity of the tender.

4. The last date and time for receipt of tenders in the Electronic Tender Box in the website (https://kppp.karnataka.gov.in) is **18.11.2025** up to 16:00 hrs. The technical bids will be opened on **19.11.2025** at 16:00 hrs. If the bid-opening day remains a public holiday, bids will be opened on the next working day at the original stipulated time.

5. The salient features of the tender are as detailed in the table below:

Sl. No	**Name of Work**	**Cost of Tender Document Rs.**	**Amount put to Tender Rs. (Excluding GST)**	**EMD amount Rs.**	**Period of completion**
1.	Supply, Design, Implementation, Operations & Maintenance of LAN & Wireless LAN Infrastructure at BWSSB	To be specified by Karnataka public procurement portal cell	398.07 Lakhs	5,97,500	6 months of supply, installation, testing & commissioning followed by 12 months of maintenance.

6. Other details can be seen in the tender documents.
7. EMD shall be paid through OTC, NEFT and DEBIT CARD &and CREDIT CARD through Karnataka Public Procurement Portal Only. The value of the Bid Security / EMD is as mentioned in the table above in column no 5.
8. Tenderers can access tender documents from the https://kppp.karnataka.gov.in website only and upload the required details; those are mentioned in different sections in the bid document into to electronic tender on the website. Scanned documents that are required to be furnished as per Section 2, 3 & 4 of the bid document shall be submitted through Karnataka Public Procurement Portal.
9. The Tender processing fee once paid will not be refunded.
10. The successful Tenderer would be required to furnish the performance Bank Guarantee from a Nationalized/Scheduled Indian Bank, with jurisdiction at Bangalore as specified, towards guarantee for completion of work within the stipulated period as mentioned in the tender document.
11. Applications / requisitions from joint venture Firms are not acceptable.
12. Bangalore Water Supply and Sewerage Board (BWSSB) reserves the right to cancel or annul the entire or part of this process of invitation at any time without assigning any reasons.
13. For any additional information regarding the above tender, the firms who are interested to quote may contact the office of the undersigned at the office address given below on all working days during office hours (10:00hours to 17:30 hours).

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Office of Chief Engineer
(Design & QA)
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Telephone No: 080-22945340

14. Tenderers shall submit offers that comply with the requirements of the bid document.

15. Corrigendum / Modification / Corrections, if any, will be published on the website only.

Chief Engineer
(Design& QA)

1. General Overview

a) Introduction

Bangalore Water Supply and Sewerage Board (BWSSB) is an autonomous body formed by the State legislature under Bangalore Water Supply and Sewerage Board Act on 10-09-1964 for Water Supply & Sewage disposal. It is one of the first Water supply & Sanitation Utilities in India with jurisdiction of entire Bruhat Bengaluru Mahanagara Palike (BBMP) Area of 800 Sqkm, (Bengaluru Core area of 245 Sqkm, 8 Urban Local Bodies of 330 Sqkm (7 City Municipal Corporation and 1 Town Municipal Corporation and 110 Villages of 225 Sq kms.)

Its Headquarters is at Cauvery Bhavan, Kempegowda Road, Bengaluru-560009.

This requirement is to fulfill the network connectivity of the employees working at BWSSB Headquarters to access their Digital Infrastructure.

b) Background of the Project

Growth in the number of users and applications has a major impact on the application performance. The current BWSSB infrastructure/facilities and architecture were not designed to handle the current increased volume of users. Implementation of multiple applications and other major workflow applications is also expected to increase more dependency on the network. Some of the major drawbacks in the present system are as follows:

- Obsolete devices and technology - Network devices are end of support from OEM, and core and distribution switches are not IPv6 ready.
- Unplanned expansion and provisioning of the existing network has resulted in cascading layers of access switches and resulted in high latency. Many places, UTP cable length is more than 90 meters.
- Network IT Infrastructure and cabling is very old, unstructured, and damaged UTP cables.
- Obsolete devices and infrastructure do not support the latest security measures and controls to restrict unauthorized access.
- No adequate number of WIFI access points to provide mobility across the Floors.

Considering the above challenges, BWSSB has decided to upgrade the existing IT network infrastructure with 100% wireless support for a period of one year.

2. Eligible Tenderers

a) Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka.

b) Tenders from Joint ventures or consortia are not acceptable.

3. Bidder Pre-Qualification Criteria:

a) All Tenderers shall provide the requested information accurately and in sufficient detail as per the Qualification information detailed below.

b) To qualify for the award of this contract, each bidder should qualify under the following criterion:

3.1 Pre-Qualification Criteria:

Minimum Eligibility Criteria for Bidders		
Criterion	**Requirement**	**Supporting Documents to be submitted with bid.**
Legal Status	The Bidder must be incorporated and registered in India under the Indian Companies Act 1956 or 2013. The Bidder must be registered with appropriate authorities for all applicable statutory duties/taxes	i.) Copy of certificate of Incorporation/Registration under Companies Act 1956/2013 (for Indian companies) ii.) GST Registration certificate, PAN Card
Local Presence in Bengaluru	The Bidder should have one office in Bengaluru with 24/7 helpdesk support and availability of technical support team.	Self-Certificate issued by the HR head of the bidder organization with 24/7 helpdesk contact details & details of Technical Support Team.
Project Expertise	a) The bidder should have executed single order / one customer value of **Rs 237.48 Lakhs** Supply & implementation/support of **on-premises** LAN, WLAN, NAC, NMS, ITMS solution during last 5 years as on 31st March 2025 to any SDC/StateGovt Department/GOI Department.	• Work order/ Contract clearly highlighting the scope of work, Bill of Material, and value of the contract/order. • Completion Certificate issued & signed by the competent authority of the client entity with contact details.
Technical Manpower Strength	On the time of Bidding, Bidder should have at least **30 technically qualified** and experienced professionals – **With Skill Set Required for BWSSB Project** on its own payroll for the last six months from the date of bidding, in networking (LAN/WAN & Wireless LAN), network access control, and/or network/cyber security.	The bidder shall furnish an undertaking /Certificate from the bidder's HR Department certifying the technical manpower in its payroll.
Financial Strength	• The Bidder shall have an average annual turnover of **Rs.939.46 Lakhs** or more over the last 2 Financial Years	1. Audited financial statements for each relevant Financial Year. 2. Statutory auditor's/CA certificate clearly specifies the

	(till FY 2024-25) from the **IT /Cyber security** Projects, including implementation and operations. • The bidder should have a positive net worth in the last 2 financial years (till FY 2024-25) as of 31.03.2025.	annual turnover for each relevant financial year for the mentioned criteria. 3. Certificate from the Statutory Auditor/CA on positive net worth for each relevant Financial Year.
Quality & Security Standards	The Bidder shall have the following Certifications valid at the time of Bidding: • ISO 9001:2015 for Quality Management Systems or latest certification • ISO 20000:2018 for IT Service Management or latest certification • ISO 27001:2022 for Information Security Management System or latest certification • CMMI Level Level 3 and above certification	Copies of the valid certificates in the name of the Bidder.
OEM Authorizations	The bidder should submit valid letter from the OEMs confirming the following: • Authorization for bidder confirming that the products quoted are not end of life/support products within next 5 years. • Undertake that the support including spares, patches for the quoted products shall be available for next 5 years.	OEM authorization letters
Being Not Black-Listed	The Bidder shall not be blacklisted with any of the Central / State Government agencies as on the bid submission date.	Declaration in this regard by the authorized signatory of the Bidder.
Authorized Signatory	The signatory for this RFP must be authorized by Board Resolution or Power of Attorney issued by Head of the Organization/Director	Authorization letter by Board or PoA

Minimum Eligibility Criteria for OEM		
Criterion	**Requirement**	**Supporting Documents to be submitted with bid.**
Presence In India	The proposed solution OEM should be incorporated in India under the Companies Act 1956/Limited Liability Partnership Act 2008 for at least 10 years.	Certificate of Incorporation from ROC to be submitted.
Being Not Black-Listed	The OEM shall not be blacklisted with any of the Central / State Government agencies as on the bid submission date.	Declaration in this regard by the authorized signatory of the Bidder
Single OEM	All the active network components proposed under this RFP should be from the single OEM.	Declaration from OEM

3.2 Technical Evaluation Criteria:

Sl.No	Criteria	Requirements	Max Marks	Required Supporting Document
1	Technical Proposal	Understanding of Scope of work, Proposed approach & methodology, Project Management Plan and risk mitigation	40	Technical Proposalto the evaluation committee
2	Presentation / Demonstration	1) Approach & Methodology for planning, design, deployment of the proposed LAN & Wireless LAN infrastructure including Network Access Control, Passive Cabling, UPS, Management at BWSSB 2) Clear understanding of Scope of Work, Proposed Solution, Case studies depicting past experience of similar projects	40	PoC for technical evaluation in hardcopy / soft copy / Live Presentation from bidder. Bidder also needs to provide PoC in presentation form in CD/Pen Drive.
3	Technical Manpower Strength	At the time of Bidding, Bidder should have technically qualified professionals on its own payroll with technical expertise/credentials in the area of LAN/WAN, Wireless LAN, Network Access Control, or Network/Cyber security. 1.) 30 technical resources = 5 marks	20	Undertaking/certificate from the bidder’s HR department.

		2.) 50 resources= 10 marks 3.) 70 resources = 20 marks		

4. Evaluation Criteria

a) The bidders will be evaluated based on their response to the Commercial Pre-Qualification Criteria as per Section 3.1, wherein 100% compliance is required.

b) Bidders will also be evaluated for the technical qualifications as elaborated in section 3.2 and only those bidders who score at least 75% in the Technical Evaluation will qualify for the Financial Evaluation.

5. One Tender per Tenderer:

Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one Tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Tenderer's participation to be disqualified.

6. Cost of Tendering:

The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible and liable for those costs.

7. Site visit:

The Tenderer at his own responsibility and risk, is encouraged to visit and examine the site of work and its surroundings and obtain all the information that may be necessary for preparing the Tender and entering a contract for construction of the Works. The cost of visiting the Site shall be at the Tenderer's own expense.

8. Project Timeline

Sl No	Activity	Timelines by which activity needs to be completed
1	Issue of LOI	T1
2	Submission of PBG	T2= T1+2 Weeks
3	Issue of PO by BWSSB	T3=T2+1 Week
4	Supply, Installation, Commissioning of LAN, WLAN, NAC, ITSM, NMS solutions.	T4= T3+ 16 weeks
5	Final Acceptance Testing and Acceptance by BWSSB /TPA	T5 = T4+ 4 weeks

9. Payment Terms:

a) 50% of the Total Cost of Ownership (TCO) against delivery of materials (pro-rata basis).

b) 30% of TCO against installation of the equipment and successful Provisional Acceptance Test. In case of absence of site readiness, payment will be made not later than 30 days after the installation and PAT.

c) 20% of the TCO on completion of Final Acceptance Testing and Go-Live along with submission of a PBG/Security Deposit of 3% of the total Bid Value. The PBG/Security Deposit will be valid for a period of 15 months from FAT.

d) Manpower: The payment for manpower shall be made quarterly in advance.

10. BWSSB LAN Upgradation Project

This project encompasses the comprehensive supply, installation, configuration, testing, commissioning, and ongoing support of cutting-edge LAN and Wireless LAN infrastructure. The solution should deliver advanced network management capabilities, sophisticated access control systems, comprehensive IT service management, and robust network cabling infrastructure, ensuring optimal performance, enterprise-grade security, and unwavering reliability.

10.1 Objectives of the LAN Upgrade

Considering the current LAN network challenges, BWSSB indent to set up a high-performance, reliable, and secure LAN network across the Floors.

- The new network should have equipment at core and Access level in high availability (with 100% redundancy).
- Wireless connectivity across the buildingsfor increased mobility.
- Access points should be deployed with adequate security measures.
- It’s expected that while network performance in terms of uptime should be more than 99%
- Access level users should get minimum wireless bandwidth for accessing the applications.

10.2 To-Be Design Considerations

10.2.1 Two-Tier NetworkArchitecture (Collapsed Core)

In 2-tier network architecture, the end device will connect to the edge switch. The Edge switches forwards traffic to the Core switch. The Core switch shall be high performance and provide a high level of redundancy within the backplane of switch fabric. The core switch shall be kept at 1st Floor Server room.

10.2.2 Structured Cabling System

As the foundation of the LAN backbone, a comprehensive Structured Cabling System (SCS) is essential to deliver efficient, secure, and scalable physical wired connectivity. The SCS serves as the critical infrastructure foundation for the entire network ecosystem, making it imperative that the BWSSB Network design

and implementation process allocates adequate time and resources to ensure meticulous planning, professional installation, and proactive maintenance of this vital system.

10.2.3 Future-proof

Since a Structured Cabling System installation is designed to endure for 10-15 years, it could be quite some time before an upgrade to the cabling is necessary, even though the network technology has already surpassed the performance capabilities of the existing setup. Thus, it is crucial to ensure that the installation is future-proof.

10.2.4 Capacity Planning

The quantity of fibre strands required is significantly influenced by the present demands of the facility. For every connection established between two points, it is advisable to maintain a minimum of 50% spare capacity relative to the needs at the time of installation. Furthermore, it is recommended to account for an extra 25% spare capacity on single-mode fibres based on the overall fibre requirements at the time of installation.

11 Proposed LAN Architecture

The architecture and design outlined in this RFP are intended solely to give bidders an overview of the work scope and expected outcomes associated with this RFP. It is crucial that bidders take responsibility for the proposed solution design and the network, ensuring it achieves the desired outcomes (project objectives and service levels specified in this RFP) throughout the duration of the agreement. Additionally, bidders must provide an OEM certified design document for both wireless and wired networks during the network design phase.

The suggested architecture for the BWSSB LAN will consist of the following four key components:

11.2 Fibre Backbone

A fiber backbone network will be established with a Core Network Rack serving as the central aggregation point for all BWSSB LAN traffic. Given the significant switching capacity and scalability needs, core switches are selected with a high availability configuration.

11.3 Wireless LAN Network

(a) AccessPoints

The suggested access points (APs) must be compatible with the most recent Wi-Fi standard, 802.11ax Wave 4x4, and they should also be equipped to manage increased demand. Networks frequently encounter unexpected surges in user

traffic. However, the proposed solution must incorporate Flexible Radio Assignment, which automatically detects when a significant number of devices are connected to the network and adjusts the dual radios to accommodate more clients. The efficiency of radio frequency (RF) is enhanced through the use of multi-user, multiple-input, multiple-output (MU-MIMO) technology. MU-MIMO enables an access point to transmit data to multiple clients simultaneously, rather than sequentially to a single client. The proposed solution must have, but support not be limited to:

- Prepare for an increasingly wireless future as IoT, video, and mobile applications.
- Improve customer experience with highly accurate contextual data
- Deliver better customer service and employee experience with faster wireless connections.
- Detect applications, monitor their performance, and troubleshoot issues.
- Protect your investment by accommodating growth while continuing to work with existing equipment.
- Support mobility across the Floors / buildings.

(b) WLAN Controllers

WLAN Controllers enable the identification, analysis, and optimization of application traffic utilizing Application Recognition libraries for thousands of applications.

These controllers are designed to offer next-generation hotspot capabilities. They should also ensure network security and optimization for mobile clients, which are IPv4 and IPv6-enabled. Wireless Controllers must facilitate system-wide functions to provide:

- Flexibilitytoconfigurewirelesspolicy,management,orsecuritysettingsatanyti methrough centralized provisioningand management.
- Fasterresponseto businessneedsbycentrallymanagingwirelessnetworks.
- Standardized APconfiguration forsoftware versioning.
- Wirelessintrusionprevention system(wIPS)capabilities.
- Network-wide QoSforvoiceand video across wired and wirelessnetworks.
- Network-wide centralized securitypoliciesacrosswired and wireless networks.
- Industry-leadingmobility,security,and managementfor IPv6anddual-stackclients,equipping administratorsforIPv6troubleshooting,planning,andclienttraceabilityfro macommonwiredand wireless managementsystem

11.3.1 Wired LAN Network

Each room shall be provided with a limited number of LAN ports for connecting:

(a) Legacy devices

(b) Heavy data transfer applications.

Based on the site survey and where bidder shall continue using the existing LAN connection with the approval of BWSSB

11.3.2 Centralized Management, Access Control and ITSMApplications

Proposed centralized management applications for network, which simplifies network management, Security, and Access Control. The solution would include the following components

(a)AAA Server

- AAA server acts as Certifying Authority (CA) server and supports a self-service portal to roll out certificates to individual desktops/laptops.
- Shall support wired & wireless users with a variety of authentication methods (802.1X, MAC auth, Web auth)
- OTP based/fixed time-based access for guest network users.

(b)NMS Application

Shall provide Wireless LAN Planning and Design, Network Monitoring and Troubleshooting, Indoor location monitoring capability, and Wireless IPS management.

(c)Helpdesk Management System

Helpdesk Management System centrally manages and streamlines IT helpdesk requests and complaints raised by BWSSB users.

Detailed requirements of the applications are provided in the technical specifications and scope of work sections. Bidder should provide all necessary hardware and software infrastructure required for the deployment of above applications in a high availability mode, without any additional cost to BWSSB. The hardware should be sufficiently sized to ensure that average CPU and Memory usage is not exceed the 70% limit.

11.4 Security Architecture

Since Network will be predominantly wireless, security is of prime consideration while conceptualizing the network and selection of appropriate technology.

The network will consist of the following categories of users:

		Devicety		
		Desktop	**Laptop**	**MobilePhone**
UserType	**Employee**	Permitted	Permitted	Permitted
	Sr. Management	Permitted	Permitted	Permitted
	Guest	Notpermitted	Permitted	Permitted

Pre requisites:

(Existing users will be compulsorily onboarded to Active Directory- Current AD)

11.5 Process Active Directory:

Active Directory policy shall be defined. Password policy shall be defined.

1) Bidder should collect the following data, but not limited to, about all the computing devices, including desktop, laptop, etc.
    a. First name(s) and Last Name(s)
    b. Designation
    c. Sub Department
    d. Organizational Unit
    e. Department
    f. Mobile number or landline number
    g. MAC ID

The collected information is populated in the AAA server by Bidder. The information collected is also configured in Active Directory by BWSSB IT Team.

2) Any needed data shall be transferred from the user's local login to the temporary storage, if applicable
3) Thereafter, users can log in only with the domain. When the user logs in for next time, the system will force them to change the password as per the password policy.
4) The data stored in temporary storage shall be transferred back to the domain login of the user, if applicable

Any necessary permission/configuration, including printer, scanner configurations,will be performed by the BWSSB IT team.

11.6 On-boarding Process:

A. One Time Process for new implementation:

Employee Desktop:

1) Employee logs into the desktop with his/her domain user ID/password credentials
2) On successful login, employee selects the onboarding SSID
3) Employees username, password details will be fetched based on step 1 and verified in the AAA
4) server against the details already populated by bidder
5) Upon approval by IT team at Step 3, a non-transferable certificate is pushed to desktop for this user, and the user is successfully onboarded in the new network

Employee Laptop:

1) Employee logs into the laptop with his/her domain user ID/password credentials
2) On successful login, employee selects the onboarding SSID

3) Employees username, password details will be fetched based on step 1 and verified in the AAA
4) server against the details already populated by Operator
5) Upon approval by the IT team at Step 3, a non-transferable certificate is pushed to the laptop for this user, and the user is successfully onboarded in the new network

Employee Mobile Phone:

1) Employee gets his phone registered with Operator. BWSSB Operator configures the mobile number in AAA server
2) Employee opens the webpage with his/her domain user ID/password credentials
3) On successful login, employee selects the onboarding SSID
4) Employees' user name, password details will be fetched based on step 1 and verified in the AAA
5) server against the details already populated by Operator team
6) Upon approval by IT team at Step 3, a non-transferable certificate is pushed to mobile for this user, and the user is successfully onboarded in the new network

B. Guest device installation

Guest Laptop / Mobile Phone :

1) Guest selects the guest SSID from his/her laptop.
2) Enter his/her email ID, phone number, select sponsor department, and email ID, and submit
3) Sponsor logs in to the guest management portal, verifies the guest, and approves/rejects the guest login
4) On approval, guests get internet access ona laptop for N number of hours on that day

Note:

The selected bidder shall prepare a detailed SOP (Standard Operating Procedure) and policy as per the above requirement for granting access to network and clients onboarding proofs to the network as part of the network design,and the same needs to be approved by BWSSB before starting of implementation of the project.

The activities to be performed on the Desktop, Laptop, and Mobile devices will be done by BWSSB IT team.

11.7 Security consideration:

Multi Factor authentication

- Multi factor authentication for access, i.e., Active Directory, MAC ID, and unique Certificate.

- Binding BWSSB Users (other than Guests) to Home Access Points
- Each user shall be bound to one or two contiguous Access Points (called home Access Points) (except roaming user profile).
- While accessing network through home access points, users will be able to have full access to bothintranet and internet. Once users are away from home access points (in roaming), theywill be able to access only the internet.

Limiting power of access points in public roadside facing buildings/rooms

- Power level of Access Points located in rooms in close proximity to public roads shall be adjusted in a manner such that outside the building, there will be no or feeble signal availability.
- This will ensure no one can access wi-fi just outside the building.

Access denial scenarios:

No access to unregistered device

- Only devices (Desktop, laptop, and Mobile phones) whose MAC-IDs are registered in AAA of WLAN,
- shall be allowed access to the network. This will ensure unauthorized devices can’t access the network.

No access to Rouge Access Points

- Only Access Points registered with WLAN shall be allowed in the network. Certificates will be installedin genuine Access Points. Hence,rogue access points not having genuine certificate can’t access the network

11.8 RF Planning, Real-Time Monitoring & Optimization

- Support for **auto-channel selection** (DFS-aware) to avoid interference.
- **Dynamic power adjustment** based on network conditions.
- **Band steering** to intelligently move clients between 2.4 GHz and 5 GHz/6 GHz bands.
- **Load balancing** across APs to prevent congestion.
- **Continuous scanning** for rogue APs, interference sources (Wi-Fi & non-Wi-Fi), and noise.
- **Heatmap visualization** for signal strength, coverage, and capacity planning.
- **AI/ML-driven insights** for predictive issue resolution.

11.9 Structured Cabling and Power Backup:

a) **Passive Cabling and Racks**: Ensure robust and organized network cabling, supporting high-speed data transfer and reliable connectivity.

b) **UPS for Power Backup**: Provide uninterrupted power supply to critical network components, ensuring continuous operation during power outages.

12 Scope of Work

This Request for Proposal (RFP) seeks to upgrade the existing BWSSB network infrastructure, along with its operations and management (O&M) services, for a period of 1 years from the date of acceptance. The key project activities are categorized as follows:

- Taking over the existing BWSSB network at Cauvery Bhawan
- Upgrade of BWSSB network
  - Site Survey
  - Installation of structured cabling, equipment racks, UPS, etc.
  - Installation & configuration of the Wired LAN
  - Installation, configuration of the Wireless LAN
  - Implementation of Network Access Control, configuration of user authentication
  - Installation & configuration of network management & ITSM help desk tool
  - Testing, Final Acceptance and Go-live
- Operation and Management for One years

12.2 Taking over the existing BWSSB network

Bidders are strongly encouraged to conduct a site survey of the current network at their own expense and risk to obtain firsthand knowledge of the existing BWSSB LAN infrastructure and equipment located in hub rooms.

The successful bidder will be responsible for taking possession of all equipment, cables (including UTP and Optical Fibre cables), cable accessories, and infrastructure from the current network operator.

The current network operator is required to transfer all project equipment at every location in operational condition along with valid licenses to the successful bidder.

A jointly signed "takeover/handover" document, executed by both the incumbent network operator and the successful bidder, must be submitted to BWSSB within 30 days following the signing of the agreement.

All passwords and configuration details will be provided to the successful bidder by the existing network operator.

The broad scope shall be as follows;

a. Bidder should submit a takeover plan for the existing BWSSB LAN within one week of signing of the agreement.

b. The successful bidder shall take over the network within 30 days from the date of signing of the agreement and shall coordinate and work in parallel with the present Network Operators for a period of 30 days towards the smooth transition and to ensure minimum downtime.

c. Takeover the existing network from the present Network Operator, which involves activities such as site visits, preparation of necessary documentations on Asset Inventory, Configurations, as-built network diagram, etc.

d. The detailed list of the existing devices installed shall be provided to BWSSB based on physical visit within 2 weeks of signing of the agreement. The report should include status of the installed devices, spares available, functionality, health of devices (AC, UPS, etc), backup configurations, AMC, Network Diagram, and other related documents.

e. Operations and maintenance of the network shall commence from the date of takeover.

12.3 Upgrade - Implementation of LAN & WLAN at BWSSB, Cauvery Bhawan

The bidders are strongly advised to study the Cauvery Bhawan building by way of site survey at their own cost to get first-hand information on the room layouts.

The broad scope shall be as follows:

a) Bidder should submit a takeover plan for the existing BWSSB LAN within one week of signing the agreement.
b) The successful bidder shall conduct a survey of the building and prepare designs of cable layout, placement of network racks, location of Wireless Access Points (WLAN AP) for optimum coverage.
c) The successful bidder shall submit the design and implementation plan, including but not limited to passive cabling design for OFC and UTP, Wireless AP placement for optimum coverage, VLAN and IP addressing schema, etc., with competent authority of BWSSB for final approval before deployment.
d) Operations and maintenance of the network shall commence from the date of Go-Live.

13 High Level Plan for Deployment

The bidder is required to design, supply, install, operate, and maintain the BWSSB LAN & WLAN Network Infrastructure for a period of one years from the date of acceptance of the new network.

The Bidder must design and implement the new Network in parallel to the existing BWSSB LAN network. The bidder shall follow the below high-level plan for the implementation of the new LAN and WLAN infrastructure at BWSSB, Cauvery building.

i.) Laying of the fiber connection across the floors through different paths.

ii.) Complete the required fibre terminations for Core Switches and Access Switches at designated rack locations (as decided with mutual acceptance of the design by BWSSB's competent authority).

iii.) Install Equipment Racks at designated locations.

iv.) Complete copper cabling required for Access Points

v.) Installation & configuration of Core Switches in High Availability (HA)

vi.) Installation of PoE+ Access Switches.

vii.) Installation & configuration of Wireless Controllers in HA

viii.) Installation of Access Points and setting up the wireless network across all the floors of the building

ix.) Installation and Configuration of Network Access Control and User Authentication

x.) Installation & configuration of Network Management & ITSM helpdesk tools

xi.) Complete the onboarding process of all wireless enabled end clients to the wireless network

The above plan is only indicative; the bidder should submit a project plan which should include the approach & methodology, governance plan. The entire scope of implementation of the LAN/WLAN at BWSSB is divided into the following phases:

i.) Site Survey and Planning

ii.) Network Design

iii.) Installation & Commissioning

a. Setting up of passive cabling, racks, UPS

b. Setting up of Wireless Network

c. Setting up of Wired Network

d. Setting up of Network Access Control, Network Management & ITSM tools

iv.) Acceptance Testing

14 Site Survey and Planning

The bidder shall do the complete site survey of the entire building to re-confirm the distances between the floors and the rack locations. The bidder shall submit the site survey report to BWSSB for approval. Site survey should indicate all the parameters required for laying cables, closet positioning of the equipment, and

wireless signal strength details, etc. Site survey report shall consist of the following:

i.) Complete layout of the proposed cabling across the floors of the building, including Cable pathways and raceways for cabling infrastructure.

ii.) Rack locations / Closest locations and positioning of all the equipment.

iii.) Wi-Fi heat map survey report for all the floors/rooms of the building and identification of placement of Access Points

iv.) Requirements of any additional rack locations, Civil or Electrical works, UPS wiring, etc., required for any existing rack locations if any.

v.) Final Bill of Materials

BWSSB, on its part, shall arrange the civil and electrical works required for new rack locations including UPS electrical wirings etc., however bidder has to identity and update BWSSB on the requirement of any additional LAN rooms/Civil Works/Electrical works/ UPS wirings that needs to be completed for the successful implementation of the project in well advance. Any civil works required for mounting of access points, for laying of cables or grounding of the racks, etc., shall be the bidder's responsibility.

15 Network Design

The activities during this phase would be to prepare implementation plans and detailed design documents for the BWSSB LAN & WLAN implementation. The design shall be by the requirements of this RFP and the technical proposal and BOM submitted by the bidder. Any changes due to the site details shall be highlighted during the design phase, and the BWSSB has all rights to accept or reject any deviations, provided the entire functional and technical requirement is met as per RFP. The final quantity in BoM will be revised based on the design submitted.

The main steps in this phase shall be as follows:

a. As part of the network design phase, the successful bidder shall submit a detailed project report, plan, and approach of implementation.

b. The bidder should submit a detailed project plan including but not limited to schedules of supply, installation, testing, and commissioning.

c. The bidder shall, after the necessary study, finalize the network diagram in line with the requirements of this RFP and the agreement signed with the BWSSB.

d. The Network Infrastructure must operate ‘round the clock’ since it supports critical systems. For this reason, the successful bidder shall incorporate necessary and effective resiliency in the network.

e. The successful bidder would be required to submit the proposed design and final blueprint of the wireless and wired network to BWSSB before commencement of the work related to LAN Cabling. Any modification as desired by the BWSSB shall be incorporated by the successful bidder.

f. The aspects to be covered in detailed project report are as below:

   i. WLAN and LAN design – address total node requirement (e.g. survey & prepare list of nodes locations), APs, modular design with provision for easy additions, meet all the application requirements, capable for data and video, use latest fibre/ CAT 6A/ CAT6/ STP technologies for backbone and edge for easy integration with WAN.

   ii. Design of Racks, passive cable dressing, power requirements, cooling/airflow requirements etc.

   iii. Carry out the feasibility of:

      - Installation of Switches, Access Points, UTP, OFC routing : To be done on building blueprint / plan with scales & distances,
      - Integration of existing infrastructure (if required) with new infrastructure
      - Digging work for laying up cable and installation of other equipment along with necessary permissions required from the respective authorities.
      - The proposed design should adhere to security guidelines issued by MeitY, GoI and Government of Karnataka. The design should also take care of all the security provisions for wired & wireless LAN.
      - UPS Installations – Requirements for new electrical wirings required for all rack locations so that BWSSB can provision new electrical wiring for the UPS systems.

   iv. Undertake planning for the following:

      - Plan and approach for structure cabling and asset tagging for infrastructure
      - Creation of separate cable trays / pathways / raceways as required.

- Preparation of LAN IP addressing scheme, create building VLAN for segregation between user departments.
- Creation of VLANs, SSIDs across the floors for seamless roaming of wireless LAN users.
- Address all issues related to switching, Wireless LAN, Network Access Control configuration.

g. Along with network design, the successful bidder must provide network Acceptance Test Plan (ATP) for BWSSB approval, which shall be reviewed and approved by BWSSB for conducting Final Acceptance Test (FAT).

16 Installation and Commissioning

The installation and commissioning shall be carried out in three phases – installation and commissioning Core Solutions, setting up of setting up of wired connectivity for user end-points and the Wireless Network.

A. InstallationandcommissioningCoreSolutions(CoreSwitches,Access Switches, UPS, Wireless LAN controller, Network Management System, NAC, etc.)

a. In the first phase the successful bidder must complete all the passive cabling (including OFC termination required for resilient connectivity between Core and Access switches and the) except the connectivity for user endpoints. All the passive cabling must be done in parallel to the existing network, without causing any downtime to the existing/old network at BWSSB. Bidder should provide adequately sized (CPU and memory utilization shall not be more than 70%) Servers, Operation system and supporting software required for the deployment of proposed NAC, Network Management for wired & wireless LAN and ITSM Helpdesk Solution. The servers such deployed should be in High Availability (Active-Active/Active-Standby) mode.

b. The overall activities shall include:

i.) Installation of Equipment Racks and laying of OFC between the various floors of BWSSB’s Cauvery building for connecting Core to Access Switches.

ii.) Cabling (OFC & UTP) at the central NOC/Server room for connections between Core Switches, Wireless Controller, Servers for NAC, Network Management, ITSM Helpdesk along with connectivity to the existing Firewall/Ethernet Switch/Router of BWSSB for Internet & WAN connectivity.

iii.) Laying of UTP cables for connecting Wireless Access Points to Access Switches.

iv.) Installation and commissioning of UPS & batteries in Central NOC/Server room as well as at all the Access Switch locations on various floors of the Cauvery Building.

v.) Installation and commissioning Core Switches, Access Switches, Wireless LAN Controller and Servers for NAC/AAA, Network Management and Helpdesk in HA mode.

vi.) IP addressing scheme, creation of in-building VLAN for segregation as per design approved by BWSSB.

vii.) Setting up security policies as mutually agreed upon with BWSSB.

viii.) Integration of the Core Switch equipment to existing WAN & Internet gateway/firewall/switch at BWSSB.

B. Setting up of Wired Network

a. Laying UTP cables to room and user endpoint location from the Access switch locations as per design approved by BWSSB.

b. Removal of existing unused UTP cables/cables trays/raceways etc., after taking due approval from BWSSB.

C. Setting up the Wireless Network

a. In this phase the successful bidder must set up the complete wireless network and onboard all wireless enabled end user devices. BWSSB may upgrade the existing user end devices with USB wireless dongle/card.

b. Installation and mounting of Access Points and Access Switches as per BWSSB approved layout.

c. Integration of access points with WLC/NAC/NMS.

d. Setting up Wireless security policies as mutually agreed upon with BWSSB

e. Onboarding the user endpoints/client devices to wireless network as per onboarding process defined in the RFP/approved design by BWSSB.

In addition to the above, the successful bidder must ensure and complete the overall installation and commissioning as below:

a. Installation shall include components as suggested in the BOM of the RFP or as arrived and approved by the BWSSB after the design phase.

b. The bidder shall coordinate with the BWSSB for installation schedule for the entire project. This process must begin at the Project Initiation/Kick-off Meeting.

c. Prior to the furnishing or installing of any equipment, necessary approval shall be obtained from BWSSB.

d. The bidder is required to install, configure, and test all materials and equipment.

e. All debris and dust resulting from the bidder's work shall be cleaned up and removed from the buildings daily by the successful bidder at its own cost. The premises shall at all times be kept in a clean, safe, and professional manner.

f. The bidder has to supply all the materials which are required for structured cabling, and the cost of the same should be included in the overall bid.

g. The space given should not be used for any purpose other than for delivering the services as defined under this RFP.

h. The bidder is also required to do the integration of the new wired & wireless network with BWSSB’s existing network/WAN/Internet gateway/firewall.

i. The materials/equipment shall be delivered to its proper location and installed by bidder without additional cost or expense (i.e. shipping and delivery charges must be included in the proposal costs), which shall not be deemed to have accepted any equipment until the Date of Acceptance.

j. During the time between delivery and acceptance, the BWSSB cannot be held liable for any damages to or theft of any components. It will therefore be the responsibility of the bidder to obtain insurance against loss, theft and damage.

k. There should not be any unplanned downtime in the existing network. Bidder should not disrupt the existing network without informing the BWSSB Authority and approval of the Authority is required before bringing down any of the network in any of the buildings.

l. The accessories (including power cables, mounting kit, Power strip etc.) required for the installation and configuration of all proposed active/passive network should also be specified and supplied by the bidder. BWSSB will not arrange that. If there is any/whatsoever gap/interpretation/misunderstanding between BWSSB’s requirement and bidder/OEM understanding for proposed solution, it will be the responsibility of bidder to fill up the gap on time without any extra cost to BWSSB during implementation or warranty period.

m. BWSSB, on its own initiative, shall be responsible for the availability of raw electrical power at the rack locations for input to the proposed new UPS. The electrical wiring and electrical accessories required for this purpose shall be the responsibility of BWSSB. Any genset for backup power if required shall be provisioned by BWSSB at its own expense.

n. The electrical wiring including any accessories required for electrical connectivity between the UPS and the battery bank and from UPS

output to the PDU of the equipment Racks shall be responsibility of the successful bidder.

o. Bidder shall provide and install all cables and connectors necessary, including both copper and fibre optic patch cables, to complete the installation. All cables must to be installed in a neat and workman like manner and adhere to leading practices for cable management.

p. All OFC jumper/patch cables installed must be labelled according to TIA/EIA standards and must indicate connections at both ends.

q. All the cable conduits should be adequately closed at the ends.

r. The cables should be appropriately marked, numbered and labelled.

s. There should be enough space between data and power cabling and there should not be any cross wiring of the two, in order to avoid any interference, or corruption of data.

17 Commissioning

a. The scope of commissioning shall mean to configure and integrate the network infrastructure adhering to essential security and technical specifications as per this RFP, and shall be applicable for all the equipment, but not limited to Core Switches, Access Switches, and Wireless Controller, Wireless Access Points, NAC/AAA, Network Management, Helpdesk solution, etc.

b. The successful bidder shall be responsible for installing IP (manual/dynamic) addresses in every addressable device put in place as part of this project, and to ensure network reachability and authentication to those devices and their respective users.

c. The successful bidder shall carry out liaising with the respective operator for network integration of BWSSB's existing network/internet/WAN gateway. BWSSB, on its part shall help and extend its cooperation to the successful bidder for such activities.

d. Implementing security measures so that unauthorized persons cannot connect to the Local Area Network (wired + wireless).

e. Configure for optimal resiliency/high availability, network routing, load balancing as per the requirements.

f. Carrying out all general tests such as Power on test on delivery, pre-installation checks to ensure correct connections, completeness of system documentation, etc.

18 Acceptance Testing

The bidder should prepare an acceptance test plan (ATP) covering test procedures for all aspects of RFP compliance. The ATP shall be approved by the BWSSB. ATP shall be executed by the successful bidder along with the BWSSB nominated

representative. The test result shall be captured and submitted to BWSSB along with the acceptance test report for BWSSB approval.

The Final Acceptance of network shall occur after:

a. 15 consecutive days with 99 percent per day or better availability across the Network (this should be the average availability of Core Switch, Access Switches, Access Points, WLC, NAC, NMS, and helpdesk solution).

b. System Integrator must demonstrate to the BWSSB, IP “pinging” across all devices/nodes.

c. Equipment must run 15 consecutive days without any equipment hardware failure. Failure during that time will require replacement and another 15-day period for the testing of the replacement item.

d. The successful bidder will gather statistics from installed equipment showing uptime results for the 15 days, separately for each piece of equipment installed as part of the contract.

e. The bidder shall demonstrate that all of the work has been completed in accordance with the contract and RFP specifications and approved design finalized during project kick-off meeting, including structured cabling, and all the conditions mentioned in the above section have been met.

f. NAC, Wireless controller, NMS, and Helpdesk should have been successfully commissioned and are able to perform the functionalities, monitor, and generate reports as detailed in this RFP.

g. Bidders has demonstrated no device can access the network without proper authentication. Similarly, no access point can join the network without proper authorization.

h. All of the documentation requirements should be submitted by the successful bidder (Design, Architecture, Network layout Plan, Data Sheets for all Components, and User manual, etc.) for the successful completion of the Acceptance Test.

i. Any observations raised by BWSSB on acceptance test results/reports bidder should address the same within 10 working days of sharing the observation. After the successful run of the test procedures, BWSSB (or its designated representative) shall provide the written approval of acceptance of FAT. At this time, upon the BWSSB’s written acceptance, operations and maintenance period for the new BWSSB LAN starts.This constitutes Date of Acceptance, and this shall constitute the GO-LIVE.

j. The warranty shall begin with the date of acceptance/Go-Live.

19 Warranty

a. The bidder is required to provide the warranty for all the equipment supplied under this RFP, for a period of one years from the date of Go-Live.

b. The warranty shall start from the date of acceptance of the final acceptance test (FAT).

20 Operation and Management

Operation, managing, and maintenance of the entire network with committed SLA shall be for a period of one years from the date of Go-Live.

a) Operation and Management Scope of Work

Thescopeofworkforoperationandmaintenance(forbothexistingandnewBWSSB LAN)isdetailed below.

a. The successful bidder is required to deliver all services as per section detailed below under the section “Service Requirements”. The bidder shall deploy at least two (02) resident engineers (RE) at BWSSB’s Cauvery building as per BWSSB’s working hours (8 hours on working days). If any additional resources need to be deployed by the Successful bidder to meet the Service Requirements, the same shall be done at no additional cost to BWSSB.

b. The personnel deployed by the successful bidder shall be trained (one time) by the OEM/authorized dealer of the OEM for operation, maintenance, and configuration of the equipment.

b) Service Requirement

The services as per the scope of the contract shall include maintenance of the equipment; ensure performance of the services (Data, Voice, Video, Internet) as per the SLA. Primary responsibilities include:

i.) Monitoring the LAN and Wireless LAN, Server health.

ii.) Equipmentconfiguration management.

iii.) Upgrading the device’s OS/firmware to thelatest stable versionreleased bythe OEM(s).

iv.) UpgradingPatches and updatesonallsupplied equipment and applicationsto thelatest stable versionreleased bytheOEM(s).

v.) TheSuccessfulbiddershallmaintainupdatedelectronicformofalltheBWSSB LANassets and periodicallyshare the same in password protected file with BWSSBnodalofficer.

vi.) Inaddition,anydetails/ clarificationregardingtheassetshallbeprovidedwithin2days,based on demand fromBWSSB.

vii.) The successful bidder shall be responsible for liaising with 3rd parties like Internet Service Provider, WAN operators like KSWAN operator, KSDC, and SDC operator from an operational perspective.

viii.) All software deployed by the Successful bidder on BWSSB LAN network shall be genuine, licensed versions and shall be in the name of BWSSB.

ix.) The Successful bidder shall do periodical upkeep of the LAN rooms

x.) Periodic Preventive maintenance of the equipment (Quarterly) and backbone

Cables (half yearly) should be carried out by the successful bidder

xi.) Rectification of faults in OFC and its accessories, UTP LAN cable I/O ports, LAN port accessories, cap-on-casing, etc.

xii.) On day-to-day basis, BWSSB representatives shall be part of any configuration /maintenance activities of the network.

xiii.) Configuration Changes

a) AllMajorchangesneed tobe approved byBWSSB or its authorized representative.

b) Day-to-day activitiesin case of any changesneedto beapproved bythe ChangeManagerappointed byBWSSB.

c) AnyChangesmadewithoutapprovalmayattracta penalty.

d) BWSSB nodal officer and/or its authorized representative and key personnel should be able to initiate, review, approve, and monitor change requests based on online ITSM based requests or on e-mail communication.

e) ThebelowChangeManagementproceduremustbefollowedbythesuccessful bidder,andthe same to bereportedto the ConcernedOfficialappointed byBWSSB.

1) Determine Need forChange
2) Prepare & Plan for Change along with BWSSB representatives' approval
3) Implement the Change
4) Document the change and report the same to BWSSB authorities of the outcome.
5) Sustain the Change

c) Incidents

1. Incidentisraisedbytheenduser/BWSSBconsultantviaemail,Phone,orwebportal,orBWSSB LAN operator .
2. Biddershallinstallandconfigurethehelpdesktool,andalltheincidentsshouldbelogg edinto the servicehelp desktool,and aticketnumberhasto begenerated.
3. Concerned Engineeris assigned to resolve theticketand report, withintheSLA
4. Based onthereport, the help desktoolis updatedand closed.
5. IncidentstobeclassifiedbytheoperatorinconsultationwithBWSSBrepresentativea smentioned below.
   a. Dailyoccurringincident(ex,portdown, connectivitydown dueto rodentissues,etc.)
   b. Periodicincidents(example:Switchgoingdownduetopowerissueperiodically,c

ertainports goingdown frequently)

6. Thebelowincidentproceduremustbefollowedbythesuccessfulbidder,andthe sametobereported to the Concerned Officialappointed byBWSSB.
   a. Incidentdetection andrecording b. Classification and initialsupport c. Investigationand analysis d. Resolution andrecord e. Incidentclosure f. Incidentownership, monitoring, tracking,and communication
7. Incidents should beclassified as theyare recorded. Examplesofincidents byclassification are:
   a. Application:
      - oservicenotavailable
      - odataissue
      - oapplication bug
      - odisk-usage threshold exceeded

   b. Hardware:
      - osystem-down (serverissue)
      - owireless issue
      - onetworkissue
      - oautomatic alert
      - oprinteris notprinting
      - osystemissues

d) Automated Tickets

1. Theservicedesktool willgeneratean automated ticketwith a ticketnumber
2. Thehelp deskperson,basedon priority,willassign theticketto the concerned engineer
3. Theconcerned Engineerattendsto theticketandresolvesthesame
4. TheconcernedEngineerwillreportback,andthe helpdeskpersonupdatesthestatusandclosesthe ticket

Areportofallsuchticketsshouldbeavailabletothenodalofficerwithacapabilitytodetermine the resolutiontime, etc.

e) NMS Monitoring

Thesuccessful bidderhastomonitorthe following:

1. Uptime ofnetworkinfrastructure, Latency, Bandwidthutilization,and packetloss
2. Should monitorthe wireless networkand Role basedAccess Control

3. Shouldmonitorandprovidethepinpointvisibility intothewho,what,when,where,andhowof wirelessaccess throughitsowndatacollectionandkey integrations.Itshouldprovideconnected clientinformation, connected Aps, and Rogue Aps inthe networkasrequired.
4. Monitor and provide performanceusing dashboards and historicaldata visibility.
5. Monitorandprovidereportssummarizingutilizationofandtrafficpatternsonallnet work interfaces asrequired.
6. Shallproactivelymonitorandmaintainallthecommissionedlinksfordesiredup-timeand performance as peragreedSLA
8. Intheeventoffailure/faultinpriorityonedevices,NMSshallautomaticallydetectthe sameand send high alertsemails totheconfiguredcontacts, alongwithraisingaticket

f) Operation and Maintenance of the links across the floors of the Building

i.) TheBWSSB LANsuccessful biddershalloperateandmaintaintheOFClinksfortheentireduration of the contractperiod.

ii.) Upkeepofthe TerminalEndEquipmenttomeettheSLAparameters.Preventivemaintenanceha s to becarried outona periodicalbasis.

iii.) MonitortheOFClinksproactivelyforperformanceasperSLA,andthesamewillbe monitored fromthe NOCusinga comprehensive NMS Solution bythe BWSSB LANsuccessfulbidder.

iv.) Thedetailsof procedureforProblemResolutionandFault ReportManagementhaveto beupdated toBWSSBin a standard format.

v.) Successfulbiddershall implementcertainsecurity policiesinconsultationwithBWSSBtoalertSPAMorsuspicioustraffic generating fromand/orenteringintoBWSSB LANnetwork. Suchincidentshave to beupdatedtoTPA Successful bidderin a standard format.

g) Maintenance of UPS in BWSSB LAN

Thesuccessful bidderhave to reviewbatterycyclelifeandreplace the batteryoncethe batterycannotmeetthe required backuptimeunderbackuploadoroncethe lifeofthe battery isover,whicheverisearlier. Theassociated costsshallbe factoredaspartofmaintenancecost. Thereshallnotbe any additionalpaymentfor this separately.

h) Helpdesk Management System

Bidderhasto provide helpdeskmanagementsystemalongwith requiredhardwareand softwarefor deployment. The scopeforhelpdeskmanagementprocess isasprovided below;

a. Servicedeskshouldbecertifiedin ITIL on a minimumof3 processesandshould allowthe implementation ofIncidentmanagement,

Problemmanagement,Change Managementand Service Requestfulfillment, KnowledgeBaseManagement,ServiceAsset&ConfigurationManagement, and SLAManagementprocess.

b. Theeventsinthe NMS shallbe continuouslymonitored bythe HelpdeskManagement team.
c. TheNMS can forward or helpin generatingTrouble tickets inthe 'Help Desk'systemautomatically.
d. Helpdesksystemshould have optionto define dynamic workflowsforthe ITIL processes.
e. ShouldsupportEMAIL/SMS fornotification
f. Shall provide Web Service APIs for enabling the 3rd Party Applications to programmatically interface with Service Desk, which includes ticket creation and modification.

i) Reporting

The successful bidder should submita monthly MISreport toBWSSBon the performanceof thenetwork. Thesuccessful bidder shouldsubmitSLA compliance toreporttoBWSSB foralltheSLA conditionsdefined in thisRFPalong withthe attendancereportoftheresourcesforrelease ofquarterlypayments.The biddershould be also responsible for providinganynetwork performance/usagerelated reportsto BWSSBasandwhen requiredby BWSSB.
The followingreportsshallbesubmitted/reviewedwithBWSSBduringperiodicmeetings(asdecidedby BWSSB):

i.) Summaryand detailed NMS Reports alongwithSLAParameters data.
ii.) ProblemReportsand Resolution summary
iii.) CapacityManagement inputs and suggestions
iv.) Attendance of resources

Service LevelAgreement

Theprimeobjective oftheBWSSB LANprojectisto provide secure and high-qualitydata, voice and video servicestoBWSSB Employees.Inordertoensurethattherequiredservicesthenetworkshould beavailable roundtheclock,inanefficientmanner,a ServiceLevelAgreement(SLA)istobe signed between BWSSBand thesuccessfulbidder.

SLA Terms andDefinitions:

Sl.No	SLATerms	Description
1	BWSSBLAN	"BWSSBLAN"referstoBWSSBLocalAreaNetwork
2	Uptime	'Uptime'referstoNetworkavailabilityacrossFloorsin BWSSBcampus."%Uptime" meansratioof'uptime'(inminutes)

3	PrimeBusinessHours (PBH)	PBHrefersto theprimenetworkutilizationperiodforBWSSBLAN,which shall betypicallystartingfrom08:00hrstill20:00hrs(ie8AMto8
4	ExtendedBusiness Hours(EBH)	EBHreferstotheleannetworkutilization periodforBWSSBLAN,which shallbetypicallystartingfrom20:00hrstill08:00hrs(ie8PMto8 AM)
5	Planned	'PlannedNetworkOutage'refersto unavailabilityofnetworkservicesdue to planned maintenance.

Down time Calculation

Downtimeofalinkshallbecalculatedbasedonthedatacollectedbythemonitoringtools(NMS)ofthe BWSSB. Followingprinciplesapplyforthe calculation ofthe downtime:

1. OutputportoftheTerminalEndEquipmentshallbemonitoredby the serviceproviderforthe purposeofuptime /downtime ofthelink.
2. Alinkshallbedownwhena"Ping"testtotheaccesslayerdevicefailsduetothelinkfailureor failure of theTerminalEndEquipmentwhich are supplied/managedbythenetwork Operator.
3. Downtime withregardstoqualityofthelinkwillbe calculatedasfollows:
   a. Incaseanyofthequalityparametersarefallingunder"BreachofSLA"(as mentionedinsection onquality oflinks),alertswillbegeneratedby theNMSor through "trouble ticket" generatedbytheNetworkoperatororCallCentre arrangement.
   b. Startof the downtime willbe the time the alertsoranycallis registeredasmentioned above
   c. Polling willbedoneforall theaboveperformanceparametersatthe intervalof3minutes to checkthecompliancewiththeminimumperformancerequirements.
   d. Thelinkwillbeconsidereddowntilltheperformanceparametersarewithintheminimum performance requirements.
   e. Allthedowntimesshallbeaddedtogetherforeachlinkeveryquarterto arrive at the downtime forthatparticularlinkforthatquarter.

Note: Downtime of theendclientare notin the bidderscope.

Calculation ofUptime

'Uptime'referstoavailabilityofbandwidthforvariouslinks.Uptimeforeachlinkshallbecalculated basedon the followingformula foreverymonth:

Uptime percentage

Uptime = ((Total Time - Total Downtime) / Total Time) * 100

Note:

1. TotalAvailabletime per month duringEBH/PBH= (EBH/PBHhrs forthat location * Ndays)– SLAExclusionTime duringEBH/PBH

2. N= Numberofworkingdays

3. Downtime ofalink=Sumtotalofalldown times forthe respective linkduringEBH/PBH

4. SLAExclusionTime:

   i. Scheduled Preventive Maintenanceactivityofthe networkequipmentisnotattributedto Network Operator.

   ii. Anyscheduled andapproved preventive maintenance activityofNetworkoperatorisnot accountableforcalculations ofpenalties.

ThoughtheSLAparameterswillbecalculatedonaquarterlybasis,thepenalties willbecalculatedon aquarterlybasisbeforethequarterlypayments.The SLApenaltiesforbothEBHandPBHshallbe calculatedseparatelyandtotalledforarrivingatTotaldown time SLApenalty.

SLA to Completethe AcceptanceTest

IftheSuccessfulBidderfails tocompletetheFinalAcceptanceTest (FAT)within theperiodof6 monthsfrom dateofagreement,BWSSBmay,without prejudiceto its otherremediesunder the Agreement, levyasPenaltiesasbelow;

Milestone	Timeline	Penalty
CompletetheFATfor upgradeoftheBWSSB LAN	5monthsfromthedateofPO	NoPenalty
	Delayof0-4weeksafter5months	INR 10,000 per eachweek or part thereofofthe delay
	Delay more than 4 weeks after	INR 20,000 per eachweek or part thereofofthe delay

Anydelaybeyond12weeksshallbeconsideredasbreachofcontractandBWSSBr eservesrightsto terminate the contract.Nonreadiness of the site shouldbe clearlyspecifyin advance toBWSSBin writing /Email. Penaltywillnotbeappliedifthedelayis due to thereasonsnotattributable tothe bidder.

SLA for Uptime

A.CoreandDistributionEquipment(EquipmentwithHA)

SL No.	Parameter	PermittedDowntimeina quarter(IncludingP	PenaltybeyondPermitted Unavailabilityina

1	Coreequipment downtime	48Hours	INR1000foreach4hoursof Unavailabilityor
2	WLANControllerdowntime	48Hours	INR1000foreach4hoursof Unavailabilityor
3	AAAdowntime	48Hours	INR1000foreach4hoursof Unavailabilityor
4	NMSDowntime	48Hours	INR1000foreach4hourof Unavailabilityor
5	Simultaneousunavailability (downtime)ofprimaryand secondaryoftheanyitemsab	0 Hour	INR1000pereachhourof simultaneousunavailability or partthereofit.

Note:

1. The uptime ofthe primaryandsecondaryequipmentshallbe calculatedseparately.
2. IncaseofBWSSB LANserviceinterruption/downtimeduetocoreequipmentissueortheir fibre connectivity,sameshallbeconsideredassimultaneousunavailabilityandpenaltyshallbe applicable. Asseamlessswitchovers areenvisaged atallcorelevelequipment,anydowntime due toprimary-secondary orsecondary-primary switchovershallbeconsideredassimultaneous unavailabilityand penaltyshallbe applicable.

B.AccessLayerEquipment.

SL No.	Parameter	UptimeRequirements ina quarterduring PBH	Penalty	Uptime Requirements ina quarter	Penalty
1	Cumulative Uptimeofallthe Access Switches	99.50%	Nopenalty	N.A	N.A
		<99.50and>=99.00%	INR1,000foreverY 0.1%dropinuptim	N.A	N.A
		Uptimelessthan99.00%	INR2,000foreverY 0.1%dropinuptim	N.A	N.A
2	Cumulative Uptimeofall theofAcce	99.25%	Nopenalty	N.A	N.A
		<99.25and>=98%	INR1,000foreverY 0.1%dropinuptim	N.A	N.A
		Uptimelessthan98%	INR2,000for every	N.A	N.A

Note:

1. Due to accessrestrictions to LAN RoomsandAccessPoints duringEBH, penaltyshallnotbe applicableforAccessSwitchesand AccessPoints duringEBH.

SLA for DowntimeforOFC Links

SL No.	Parameter	PermittedUnavailability inaquarterduringP	PenaltybeyondPermitted Unavailabilityina quarterduring PBH
1	OFClinksbetweenthe Floors (CoretoAccess links)	24Hours	INR1000foreach2hoursof Unavailabilityorpartthereofit.

Quality of Links SLA

Sometimeslinkmightbeavailable,butitmightbeunusable.Inthissituationanotherparameter“Quality ofLink”should bemeasured.TheQuality ofLinkisalwaysensuredby controlling the following parameters:latency, packetlossetc.Thesaid parameters aredefined asfollows:

- **Latency**“Latency”referstotheaveragetimerequiredforround-trippackettransfersbetween two-endpointson the selectedportionsoftheLAN. Theserviceproviders areexpected to give end-to-end latencyoflessthan 1ms (millisecond)end toend.
- **Packet Loss**“PacketLoss”refers to the percentage ofpacketslostovera period oftime overa networksegment.Thesuccessfulbiddershouldensurethatmaximumend-to-endpacketlossis lessthan 1% throughoutthe network.
- **Jitter**iscalculatedasthevarianceoftheround-tripdelaymeasurementsbysendingoutmultiple packetsoveranetworksegmentwithequaltimespacingbetweeneachinterval.Thisismeasured usingUDP Jitterpackets.

SL	SLAParameter	SLA Target	Severit	Penalty
1	Latency(in Milliseconds) betweenanytwo nodeswithint	Lessthan10ms	Critical	INR500forlatency>=10msand<15ms INR1000forlatency>=15 msand<20ms INR1500forlatency>=20 ms+ INR
2	Latency(in Milliseconds) betweenanytwo nodesinbetween theFloors	Lessthan15ms	Critical	INR500forlatency>=15msand<20ms INR1000forlatency>=20msand<25ms

Note: Incaseanyoftheaboveparametersforanylinkfallsunder“BreachofSLAterms”mentioned above, itwillbetreated asdowntime ofthatlink.

ServiceLevels for ManageabilityandCapability

HelpdeskSLA

Help desk shall be applicable for all help desk tickets generated (both automated tickets/ manualtickets).

Parameter	PBH	Penaltyduring PBH(per ticket)	EBH	PenaltyduringEBH (perticket)
TimeforAnalysinganda nd Resolutionofthefau	4 hours	INR100foreachhouro f delay	N.A	N.A

SLA ExclusionTime

1. Poweroutage:Downtimecausedduetonon-availabilityofBESCOM/DGpowerformorethan 1hourcontinuouslyinadayorduetoBWSSBreasons. (theUPSsshouldtakeloadfor1 hour)
2. Anyscheduledandapprovedpreventivemaintenanceactivityofequipmentatalldepartment locationsis notaccountableforcalculationsofpenalties.

AggregatePenalty

Thetotalpenalty fora quarter duringthe O&Mperiodshallbe capped to 10%of QGRpayment forthe respective quarter.

Exit Management

1. The Bidder shall prepare and submit to the Purchaser a comprehensive **Exit Management Plan** ("Exit Management Plan") covering all aspects related to exit management for the entire contract, including Project Implementation, Operations and Management, Service Level Agreements (SLAs), and Scope of Work.

The Exit Management Plan shall include, at a minimum:

- (a) A detailed program and timeline for the transition process to a Replacement Agency, specifying the methodology and mechanisms to ensure uninterrupted service delivery throughout the transition or until cessation of services. It shall also define the transition governance structure and roles to be followed during the process.
- (b) A communication and coordination plan for informing the Bidder's staff, Purchaser's stakeholders, customers, and any related third parties to minimize operational disruption.
- (c) A plan for providing contingent or transitional support to the Purchaser or its nominated agencies, including the Replacement Agency, for a reasonable period after the handover to support continuity and knowledge transfer.
- (d) An inventory and asset handover plan listing all hardware, software, licenses, documentation, and configurations related to the project, with their ownership status clearly defined.
- (e) Procedures to transfer access rights, credentials, configurations, and documentation to ensure security, integrity, and compliance during the transition.
- (f) A risk management framework identifying potential risks during the exit process and corresponding mitigation measures.

2. The Exit Management Plan shall be submitted to the Purchaser within 30 days of the signing of the Contract and shall be subject to approval by the Purchaser.
3. In the event of contract termination or expiry, both Parties shall adhere to the approved Exit Management Plan to ensure seamless transition and minimal business disruption.
4. During the exit management period, the Bidder shall continue to deliver all contracted services with the same quality standards and SLAs as agreed until the completion of transition activities.

5. During the exit management period, the Bidder shall grant the Purchaser and/or its authorized representatives full access to information necessary to understand and document the current mode of operation, system configurations, and service delivery mechanisms.
6. The Bidder shall provide all information, documentation, and records —whether in digital or physical form—necessary to facilitate a seamless handover of operations to the Purchaser or to its nominated Replacement Agency. This includes operational manuals, asset registers, configuration details, service reports, and third-party contract information relevant to the Services.
7. The Bidder shall ensure that all documents, records, and agreements in digital and/or paper form related to the Services are maintained accurately from the commencement of project services and made available to the Purchaser or its nominated agencies for due diligence and transition-related purposes.
8. The Bidder shall provide reasonable support during the transition period, including staff availability for knowledge transfer sessions, to ensure smooth operational handover to the Replacement Agency or the Purchaser

21 Annexure-1

21.2 Technical Specifications

(a) Core Switch

S. No.	Core Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
1	The Proposed Switch should come from an OEM who is a leader in Gartner Magic Quadrant for Wired and Wireless		
2	Manageable switches should have a minimum of 48x 10G/1G SFP+/SFP ports and 4x 100G/40G QSFP28/QSFP+ ports		
3	Proposed switch should have a RJ-45 Serial console port and Dedicated Management 10/100/1000 Service Ports		
4	The form factor of the proposed switch should be 1 RU Rack-Mount Appliance		
5	Switching capacity of the proposed switch should be minimum 1700 Gbps		

S. No.	Core Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
6	Packet per second capacity of the switch should be minimum 1500 Mpps and the network latency should be <800ns		
7	Proposed Switch should support minimum 144K MAC address storage		
8	Proposed switch should support 4000 VLANs		
9	Should support min 8GB memory, 128MB flash and 128GB SSD drive, maximum to be specified		
10	The proposed switch should have an Dual hot swappable power supply.		
11	Should support Jumbo frames and link auto-negotiation		
12	Should support Spanning Tree Protocol MSTP native, and backwards compatible with RTSP, STP and STP Root Guard		
13	Should support Edge Port / Port Fast		
14	IEEE 802.1AX Link Aggregation		
15	IEEE 802.1q VLAN tagging, Private VLAN, Voice VLAN		
16	Should support IEEE 802.3ad Link Aggregation with LACP with maximum 24 Link Aggregation Group size		
17	Should support virtual wire between two ports for troubleshooting		
18	Should support Mac authentication to allow only the configured MAC address to get network acces.		
19	Should support 802.1x port-based, 802.1x MAC-based authentication, IEEE 802.1x MAC Access Bypass (MAB) and the unit should support EAP-PEAP, EAP-TTLS,EAP-TLS, EAP-MD5		
20	Switch must support a guest VLAN assignment for unauthorized users. and it should have option to specify Quarantine VLAN for users whose authentication was unsuccessful.		
21	Should support IEEE 802.1x Guest and Fallback VLAN		
22	Should support IEEE 802.1x Dynamic VLAN Assignment		
23	Should support RADIUS accounting with CoA and disconnect messages		

S. No.	Core Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
24	Switch should support local user databases and can integrate with LDAP, RADIUS, TACACS+ servers.		
25	should support Static L3 hardware-based IPv4 and IPv6 routing.		
26	Must support Dynamic Routing Protocols for IPv4 and IPv6 OSPF, RIP, VRRP, BGP, and ISIS.		
27	Should support Multicast protocols PIM-SSM		
28	Should support BFD (Bidirectional Forwarding Detection), ECMP, and DHCP server & relay.		
29	Switch should support IPV4-8K / IPV6-4K L3 Host Entries, 8K Multicast Route Entries, Route Entries (IPv4-16K/6K-IPv6).		
30	Switch must support Filtering Route maps based on routing protocol, IGMP Proxy and Querier, IGMP Snooping version 3, IP Conflict Detection and Notification, IPv6 Route Filtering.		
31	Switch must support MLD Proxy and Querier, MLD Snooping, Policy-based Routing, Unicast Reverse Path Forwarding (uRPF), VRF, BGP Ethernet VPN.		
32	should support LLDP, LLDP-MED, MCLAG (Multi-chassis link aggregation, Multi-Stage Load Balancing		
33	should support Storm Control, Loop Guard, IP Source Guard IPv6 RA Guard, LLDP-MED ELIN, Wake on LAN		
34	Switch should support Quality of Service, egress Priority Tagging, Explicit Congestion Notification, IEEE 802.1p Based Priority Queuing, IP TOS/DSCP Based Priority Queuing, Percentage Rate Control		
35	Should support Port mirroring, sFlow		
36	Should support Sticky MAC and MAC-IP Binding		
37	Switch should support ACL with the below classifier and action **1. Classifier:** a. source and destination MAC address,		

S. No.	Core Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	b. VLAN id, c. source and destination IP address, d. service (layer 4 protocol id and port number) **2. Actions:** a. allow or block the packet, b. redirect the packet, c. CoS queue assignment. d. Specify a schedule when the ACL policy will be applied		
38	Switch should support 3K ACL entries		
39	Should support Telnet,SSHv2, HTTP,HTTPS with IPv4 and IPv6 Management		
40	Switch should support SNMP v1, v2c and v3		
41	Proposed switch should be managed via both, GUI and CLI and the proposed firewall should be able to manage the switch		
42	MUST support multiple configuration files with Dual-firmware image support		
43	Should Support for HTTP REST APIs for Configuration and Monitoring		
44	Switches must be ready for appliance / VM based centralized management from day one with the below key features to support. Bidder should provide all the required hardware and software resources and licenses from day one to achieve the below management features.		
45	Solution should be ready from day one to offer visibility, user access control, and threat mitigation at the switch port level.		
46	Solution should discover automatically by centralized management and configures with Zero-touch provisioning		
47	Solution must have centralized management : configuration and reporting, Software Upgrades of Switches through a single console		

S. No.	Core Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
48	Should have option to create switch profiles to allow specific settings to be applied to all authorized Switches.		
49	Central management solution should have Robust Monitoring – Topology views of all managed switches, Port level view, Status monitoring views from single console.		
50	Support switch administrators can use MAC addresses to quarantine hosts and users connected to a Switch unit. Quarantined MAC addresses should be isolated from the rest of the network and LAN.		
51	Switch must support micro segmentation to block intra-VLAN traffic to prevent the direct client-to-client traffic visibility at the layer-2 VLAN layer.		
52	Should support in-built network access control feature in switch manager to bounce all the devices by default in onboarding VLAN, and based on the devices matching with the specified criteria, devices should be assigned to a specific VLAN. Criteria must support: a.MAC address, b. hardware vendor, c. device family, d. device type, e., device operating system and user group. If the bidder is not supported in-built, they should include all the required hardware and software resources.		
53	Should have option to create switch profiles to allow specific settings to be applied to all authorized Switches.		
54	Switch must have option to ping using Switch serial number instead of the Switch IP address.		
55	Switch manager show display port details: Port status, Port name, If the port is a member of a trunk, Access mode, enabled features, Native VLAN, Allowed VLANs, PoE status,Device information, DHCP snooping status, Transceiver information.		
56	Power Required:100–240V AC, 50–60 Hz		
57	Operating Temperature : 0°–45°C		
58	FCC, CE, RCM, VCCI, BSMI, UL, CB,		

S. No.	Core Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	RoHS2		
59	The quoted switch should allow extending the Storm Control and Port security features and extending Unified Policy Enforcement to all its ports and should be managed from the same central manager.		
60	All 1G/10G Transceiverssupplied should be from the OEM of the Switch.		

(b) Access Switch

S.No.	Access Switch: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
1	Managable switch should have minimum 24x GE RJ45 and 4x 10GE SFP+ ports, and the SFP+ ports should be compatible with 1 GE SFP.		
2	Proposed switch should have an RJ-45 Serial console port.		
3	The form factor of the proposed switch should be 1 RU Rack-Mount Appliance.It should also support 370W power budget in 24-port 802.3af/at.		
4	Switching capacity of the proposed switch should be a minimum of 128 Gbps		
5	Packet per second capacity of the switch should be minimum 190 Mpps, and the network latency should be < 1 µs		
6	Proposed Switch should support minimum 32K MAC address storage.		
7	Proposed switch should support 4000 VLANs		
8	Should support min 512MB memory, 64MB flash maximum to be specified		
9	Proposed switch should be 1 RU rack mountable.		
10	Should support Jumbo frames and link auto-negotiation		
11	Should support Spanning Tree Protocol MSTP native, and backwards compatible with RTSP, STP, and STP Root Guard		
12	Should support Edge Port / Port Fast		
13	IEEE 802.1AX Link Aggregation		
14	IEEE 802.1q VLAN tagging, Private VLAN, Voice VLAN		
15	Should support IEEE 802.3ad Link		

	Aggregation with LACP, with a maximum 8 Link Aggregation Group size		
16	Should support virtual wire between two ports for troubleshooting		
17	Should support Mac authentication to allow only the configured MAC address to get network access.		
18	Should support 802.1x port-based, 802.1x MAC-based authentication, IEEE 802.1x MAC Access Bypass (MAB), and the unit should support EAP-PEAP,EAP-TTLS,EAP-TLS, EAP-MD5.		
19	Switch must support a guest VLAN assignment for unauthorized users. And it should have an option to specify Quarantine VLAN for users whose authentication was unsuccessful.		
20	Should support IEEE 802.1x Guest and Fallback VLAN		
21	Should support IEEE 802.1x Dynamic VLAN Assignment		
22	Should support RADIUS accounting with CoA and disconnect messages		
23	Switch should support local user database and can integrate with LDAP, RADIUS, TACACS+ servers.		
24	should support Static L3 hardware-based IPv4 and IPv6 routing.		
25	Must support Dynamic Routing Protocols for IPv4 and IPv6 OSPF, RIP, VRRP, BGP, and ISIS.		
26	Should support Multicast protocols PIM-SSM		
27	Should support BFD (Bidirectional Forwarding Detection), ECMP, and DHCP server & relay.		
28	Switch should support IPV4-16k/IPv6-7k L3 Host Entries, 4K Multicast Route Entries, Route Entries (IPv4-16K/8K-IPv6).		
29	Switch must support Filtering Routemaps based on routing protocol, IGMP Proxy and Querier, IGMP Snooping version 3, IP Conflict Detection and Notification.		
30	Switch must support Policy-based Routing, MAC learning limit, Learning-limit violation log, and action.		
31	should support LLDP, LLDP-MED, MCLAG(Multi-chassis link aggregation.		

32	should support Storm Control, LoopGuard, IP Source Guard, IPv6 RA Guard, LLDP-MED ELIN, Wake on LAN		
33	Switch should support Quality of Service, egress Priority Tagging, Explicit Congestion Notification, IEEE 802.1p Based Priority Queuing, IP TOS/DSCP Based Priority Queuing, Percentage Rate Control.		
34	Should support Port mirroring, sFlow		
35	Should support Sticky MAC, IP source guard, and IP source-guard violation log		
36	Switch should support ACL with the below classifier and action **1. Classifier:** a. source and destination MAC address, b. VLAN ID, c. source and destination IP address, d. service (layer 4 protocol id and port number) **2. Actions:** a. allow or block the packet. b. redirect the packet. c. CoS queue assignment. d. Specify a schedule when the ACL policy will be applied		
37	Switch should support 1500 ACL entries.		
38	Should support Telnet,SSHv2, HTTP,HTTPS with IPv4 and IPv6 Management		
39	Switch should support SNMP v1, v2c and v3		
40	Proposed switch should be managed via both GUI and CLI, and the proposed firewall should be able to manage the switch.		
41	MUST support multiple configuration files with Dual-firmware image support		
42	Should Support for HTTP REST APIs for Configuration and Monitoring		
43	Switches must be ready for appliance / VM-based centralized management from day one with the below key features to support. Bidder should provide all the required hardware and software resources and licenses from day one to achieve the below management features.		

44	Solution should be ready from day one to offer visibility, user access control, and threat mitigation at the switch port level.		
45	Solution should be discovered automatically by centralized management and configured with Zero-touch provisioning.		
46	Solution must have centralized management: configuration and reporting, Software Upgrades of Switches through a single console.		
47	Should have option to create switch profiles to allow specific settings to be applied to all authorized Switches.		
48	Central management solution should have Robust Monitoring – Topology views of all managed switches, Port level view, Status monitoring views from a single console. Switch should allow extending the Storm Control and Port security features and extending Unified Policy Enforcement to all its ports and should be managed from the same central manager.		
49	Support switch administrators can use MAC addresses to quarantine hosts and users connected to a Switch unit. Quarantined MAC addresses should be isolated from the rest of the network and LAN.		
50	Switch must support microsegmentation to block intra-VLAN traffic to prevent the direct client-to-client traffic visibility at the layer-2 VLAN layer.		
51	Should support in-built network access control feature in switch manager to bounce all the devices by default in onboarding VLAN, and based on the devices matching with the specified criteria, devices should be assigned to a specific VLAN. Criteria must support: a.MAC address, b. hardware vendor, c. device family, d. device type, e., device operating system and user group. If the bidder is not supported in-built, they should include all the required hardware and software resources.		
52	Switch must have option to ping using Switch serial number instead of the Switch IP address.		
53	Switch must support automation stitches triggered by storm-control drop rate and Automation stitches via custom automation		

	actions like Ban IP and Quarantine.		
54	Switch manager show display port details: Port status, Port name, If the port is a member of a trunk, Access mode, Enabled features, Native VLAN, Allowed VLANs, PoE status,Device information, DHCP snooping status, Transceiver information.		
55	Power Required:100–240V AC, 50–60 Hz		
56	Operating Temperature : 0°–50°C		
57	EMC: EN 55032, EN 61000, EN 55035, SAFETY: IEC 62368, EN 62368, RoHS2: EN IEC 63000, EN 50581		
58	All 1G/10G Transceivers supplied should be from the OEM of the Switch.		
59	The Proposed Switch should come from an OEM who is a leader in Gartner Magic Quadrant for Wired and Wireless		

(c) Wireless LAN Controller

S.No.	WLAN Controller: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
1	The Proposed Switch should come from an OEM who is a leader in Gartner Magic Quadrant for Wired and Wireless.		
2	The proposed solution must be appliance based without any user-based licensing and work as a gateway device with QOS, Application Control, SSL VPN,and IPSEC VPN features inbuilt.		
3	Proposed Solution should have inbuilt SD-WAN functionality for supporting terminating WAN links in a load balancing / express route selection based on SLA.		
4	The OEM should have published all the performance mentioned on the corporate public website.		
5	The appliance should have the capability of a firewall with a minimum throughput of 35 Gbps.		
6	The appliance should act as a Switch controller and Wireless Controller and be able to manage up to 60 switches and 250 Access Points from day 1		
7	The proposed WLC should have the following firewall functionalities as the WAN links will be directly terminated to the same appliance.		
8	Should support at least 10 million		

S.No.	WLAN Controller: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	concurrent sessions & 4,00,000 new connections/sec		
9	The appliance should do stateful inspection & must also support asymmetric route if required.		
10	Should support Policy based routing, RIPv1 and v2, OSPF v2 and v3, ISIS, BGP4		
11	Multicasting must be supported bythe device.		
12	It should load balance & support automated Failover for 3 ISP's or more.		
13	The solution must support IP, MAC User, based policies.		
14	Security solutions must be integrated with Open LDAP, Radius, and AD for user-based policy.		
15	Should support Active-Active & Active-standby when deployed in HA.		
16	The solution should have WAN Path Controller and Link Health Monitoring for better application performance. Link Health monitor must identify latency, jitter, and packet loss for each ISP.		
17	Proposed solutions must support Asset tagging to segregate secured, intellectual proprietary, and unsecured devices. Based on the Asset we should be able to define intent based policy.		
18	Proposed solution should have comprehensive security controls on SSH Man-in-the-Middle (MITM) deep inspections. Like IPS Inspection on tunneled traffic and detect/prevent MITM attack, etc..		
19	The proposed solution must have the following support for IPv6 : Management over IPv6, IPv6 routing protocols, IPv6 tunnelling, firewall and UTM for IPv6 traffic, NAT46, NAT64, IPv6 IPsec VPN		
20	The proposed solution must support Active-passive, active-active, and virtual clusters for high availability.		
21	The proposed solution must have at a minimum of 4 x1G SFP, 18 x RJ45, and 8 X 10G SFP+ from day 1.		
22	The proposed solution must have a		

S.No.	WLAN Controller: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	dedicated RJ45console port, and 1 nos USB Port.		
23	Proposed solution must have the capability to virtualize one physical firewall into a minimum of 10 virtual firewalls and should be extendable up to 20 Virtual firewalls.		
24	Should be able to auto-discovery & configuration of Ethernet ports and security policies		
25	Should provide Single console management of security & network access, including device detection & onboarding		
26	Solution must have minimum VPN throughput of 30 Gbps or more.		
27	Solution must support IPSe VPN. With necessary licenses from day 1.		
28	Should support the following IPSEC VPN deployment modes: Gateway-to-gateway, hub- and-spoke, full mesh, redundant-tunnel, VPN termination in transparent mode.		
29	Solution must support the following OS (MAC OSX, Linux, Windows Vista, and with 64-bit Windows operating systems) while connecting to the office using SSL VPN.		
30	Should be able to identify & control all commonly used web 2.0 applications & should be able to detect a minimum of3000 applications.		
31	Solutionshould support creating custom application signatures.		
32	Solution should have capability to protect critical applications by enforcing granular application usage with traffic shaping.		
33	Solution must be fully managed by Web browser or via client with full options to configure Routing, Policies, address object & UTM profiles.		
34	Analyzing network traffic with real real-time dashboard and should be supporting Multi, Tenancy manage multiple subaccounts, with each account having its own administrators and users.		
35	Solution must support customizable NOC		

S.No.	WLAN Controller: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	and SOC dashboards and widgets designed for display across multiple screens in the Operations Center.		
36	Solution should provide organizations with centralized security event analysis.		
37	Solution should provide multiple report templates and more than 2000 combined ready- to-use datasets for helping build reports like health check, security events, and audit reports etc.		
38	Solution should provide an option to store and restore the logs externally after the available storage space is exhausted in the reporting appliance.		
39	Solution should be capable of generating reports in PDF, HTML, CSV, and XML.		
40	Reporting tool must have a minimum of 50+ default templates, and generate the reports.		
41	Reporting tool must support writing custom report template.		
42	Solution must support and handle 5GB of logs per day.		
43	The Proposed system should have a feature of NMS functionalities for the devices proposed, including Access Points.		
44	Layer 3 - Layer 4,NAT,VPN,Application Visibility and Control (AVC),UserIdentity,Next Generation Intrusion Prevention System (IPS),Zero Day Protection /Advanced Malware protection,Web Security Essentials / URL Filtering, WAF		
45	TCP,UDP,HTTP/TCP,TCP/UDP, HTTPs		
46	Dual		
47	The Proposed solution should be EAL / STQC Certified		
48	All 1G/10G Transceivers supplied should be from the OEM of the Switch / Wireless Controller.		

(d) Wireless Access Point

S.No.	WLAN AP: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
1	The Access Point should support the 802.11ax standard.		
2	Must have the Tri-radio option to support radio1 as 2.4 GHz and radio2 as 5 GHz devices and radio3 as 2.4GHz/5 GHz for frequency scanning.		
3	Should have 3 Internal and 1 BLE Internal antennas		
4	Should have minimum 2x 10/100/1000 Base-T RJ45, 1x Type 2.0 USB, 1x RS232 RJ45 Serial Port		
5	AP should support 802.3af with max power consumption of 17 dBm to get full system functionality.		
6	Should support Wave 4x4 MU-MIMO		
7	The access Point should support throughput in Radio 1: up to 1147 Mbps, Radio 2: up to 2402 Mbps, and Radio 3: scan only.		
8	Should support Peak antenna gain of minimum 4 dBi for 2.4 GHz, 5 dBi for 5 GHz with min 22dBm Transmission Power on both radio and Bluetooth scanning and iBeacon advertisement 6 dBm max TX power		
9	Access point should support SSIDs in Tunnel, Local Bridge, and mesh mode.		
10	Should support 16 Simultaneous SSIDs		
11	Should support following EAP types: EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0/EAP-MSCHAPv2. PEAPv1/EAP-GTC, EAP-SIM, EAP-AKA, EAP-FAST		
12	Access point should support IEEE standards 802.11a, 802.11b, 802.11d, 802.11e, 802.11g, 802.11h, 802.11i,802.11j, 802.11k, 802.11n, 802.11r, 802.11v, 802.11w, 802.11ac, 802.11ax (Wi-Fi 6), 802.1Q, 802.1X, 802.3ad, 802.3af, 802.3at, 802.3az, 802.3bz		
13	Should have physical security lock (such as Kensington lock)		
14	Should support mounting options of		

S.No.	WLAN AP: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	Ceiling, T-Rail, and wall.All these accessories should be included with the box. If not, quote all mounting kit.		
15	Access point should support below Wireless Monitoring Capabilities.		
16	a) Rogue Scan Radio Modes should support both background and dedicated		
17	b) WIPS / WIDS Radio Modes should support both background and dedicated		
18	c) should support Spectrum Analyzer		
19	d) should support Packet Sniffer Mode		
20	Must support Reliable Multicast Video to maintain video quality		
21	Must support QoS and Call Admission Control capabilities. Proposed AP must have the capability to be controlled from the proposed firewall to have unified security controls.		
22	Access point should have a static option to mention 3 controller IPaddresses to discover the controller for redundancy.		
23	Should support Local AP diagnostic web portal, Command line(CLI) directly to access point.		
24	APs should be managed via a central controller/firewall and not via other APs. Proposed Wireless Controller, Wireless Access Point, Core Switch, NAC, Access Switches, and Transceivers should be from the same OEM.		
25	Access point Operating Temperature should be: 0–45°C		

(e) Network Access Control

S.No.	NAC: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
1	The Proposed NAC Solution should be from the same OEM of Switching and Wireless Components.		
2	Proposed solutions should support automated		

S.No.	NAC: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	scanning of the network for detection and classification of devices via agent or agentless.		
3	The proposed solution should be able to create an inventory of all devices on the network.		
4	The proposed solution should be able to do risk assessment and posture check of every endpoint on the network.		
5	Proposed solution must provide extensive support for third-party network devices to ensure effectiveness with existing network infrastructure.		
6	Solutions should support automated onboarding process for a large number of endpoints, users, and guests.		
7	Solution should provide event reporting to third-party Security Information & Event Management solutions with detailed contextual data to reduce investigation time.		
8	Solutions should support enforcement of dynamic network access control and enable network segmentation.		
9	Solution must have centralized architecture for easier deployment and management.		
10	The proposed NAC solution must provide detailed profiling of even headless devices on the network using multiple information and behavior sources to accurately identify what is on the network.		
11	NAC solution should have integration support for following network infrastructure device OEMs: Adtran, Aerohive, AlaxalA Networks, Alcatel-Lucent, Allied Telesis, Alteon, APC, Apple, APRESIA Systems, Avaya, Brocade/Foundry Networks/Ruckus, Cisco/ Meraki, D-Link, Extreme/Enterasys/Siemens, H3C, HP/Colubris/3Com/Aruba, Intel, Juniper, NEC, Riverbed/Xirrus, and SonicWall		
12	NAC solution should have integration support for the following authentication and directory services: RADIUS — Cisco ACS, Free RADIUS, Microsoft IAS, LDAP — Google SSO, Microsoft Active Directory, OpenLDAP		
13	NAC solution should have integration support for the following Security Infrastructure device OEMs:Security Infrastructure		

S.No.	NAC: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	CheckPoint, Cisco/SourceFire, Cyphort, FireEye, Juniper/Netscreen, Qualys, Sonicwall, Tenable		
14	NAC Solution should support integration with multiple operating systems like: Android, Apple MAC OSX and iOS, Linux, Microsoft Windows+E26:E27		
15	Proposed solution must support integration with End Point Security Applications like: Authentium, Avast, AVG, Avira, Blink, Bullguard, CA, ClamAV, Dr. Web, Enigma, ESET, F-Prot, F-Secure, G Data, Intego, Javacool, Lavasoft, Lightspeed, McAfee, Microsoft, MicroWorld, Norman, Norton, Panda, PC Tools, Rising, Softwin, Sophos, Spyware Bot, Sunbelt, Symantec, Trend Micro, Vexira, Webroot SpySweeper, Zone Alarm.		
16	NAC solution should have integration support for MDM solutions like: AirWatch, Google GSuite, MaaS360, Microsoft InTune, Mobile Iron, XenMobile, JAMF, Nozomi Networks		
17	Solution must be provided for 500 concurrent users at start and scalability to 5000 concurrent users. All the provided licensesshould be perpetual.		

(f) Network Management System

S.No.	NMS: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
1	The Proposed Solution should be capable of managing a large-scale network infrastructure, supporting thousands of interconnected network devices and endpoints.		
2	Shall provide options for redundant deployment configurations to ensure continuous operation and minimize downtime.		
3	Should have ability to logically separate management domains for different organizational units or customers.		

S.No.	NMS: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
4	Shall have automated discovery and onboarding of network devices.		
5	Template-Based: Creation and application of standardized configuration templates. Device-Specific: Granular, per-device configuration adjustments. Revision Control: History of changes with rollback capabilities. Auditing: Compare configurations against baselines.		
6	Centralized management, distribution, and upgrade of device operating system images and software.		
7	Supports execution of custom scripts or command-line interface (CLI) sequences for advanced automation.		
8	Ability to organize devices into logical groups for easier management and policy application.		
9	Enables definition and enforcement of network-wide policies (security, access control, routing, QoS).		
10	Supports creation and management of reusable network objects (e.g., addresses, services, zones, user groups).		
11	Provides a systematic workflow for preparing, validating, and deploying policies to managed devices.		
12	Real-time monitoring of device health, connectivity, and resource utilization (CPU, memory, disk).		
13	Centralized collection, storage, and analysis of system logs and security events.		
14	Configurable alert mechanisms based on predefined thresholds or events, with various notification options.		
15	Provides visibility into network traffic patterns and active sessions.		
16	Integrated tools for basic network diagnostics (e.g., ping, traceroute) and advanced troubleshooting.		
17	Suite of standard reports covering device inventory, configuration changes, policy compliance, and security events.		
18	Ability to generate custom reports based on specific criteria and data points.		
19	Stores historical data for trend analysis,		

S.No.	NMS: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviation
	compliance auditing, and forensic investigations.		
20	Customizable dashboards for a consolidated view of network status, alerts, and key performance indicators.		
21	Centralized control over network switches, including port configuration, VLAN management, PoE settings, and link aggregation. Port-level security policy configuration.		
22	Centralized management and provisioning of wireless access points. Configuration of WLAN settings (SSIDs, security, radio). Monitoring of wireless client connectivity and performance. Radio frequency (RF) management.		
23	Granular control over user permissions based on roles and responsibilities.		
24	Utilizes industry-standard secure protocols for communication between the NMS and managed devices.		
25	Maintains comprehensive audit logs of all administrative actions performed within the NMS.		
26	Supports integration with third-party systems such as SIEM, ticketing, and orchestration platforms.		

(g) ITSM Help Desk tool

Sr No.	ITSM Help Desk: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviations
1	**General Requirements**		
1.1	ITIL v4 compliant with core ITSM process support		
1.2	Shall support RBAC, LDAP, SSO, and MFA		
1.3	Web-based interface		
2	**ITIL Processes to be Supported**		
2.1	Incident Management		
2.2	Problem Management		
2.3	Change Management		
2.4	Service Request Fulfillment		
2.5	Knowledge Management		
2.6	Asset & Configuration Management (CMDB)		

Sr No.	ITSM Help Desk: Minimum Technical Requirements	Complied? (Y/N)	Remarks/ Deviations
2.7	Service Level Management		
2.8	Release & Deployment Management		
3	**Functional Capabilities to be supported**		
3.1	Auto-ticket generation via email, portal, or monitoring tools		
3.2	Customizable workflows for approvals, escalations, and notifications		
3.3	Searchable knowledge base linked to incidents and requests		
3.4	Self-service portal for users		
3.5	SLA definition, monitoring, and reporting		
3.6	Real-time dashboards and exportable reports		
3.7	CMDB integration with auto-discovery		
3.8	Change calendar with impact analysis		
3.9	Multi-channel support: email, chat, phone, portal		
4	**Integration Capabilities to be present**		
4.1	Integration with NMS tools, Active Directory, Email/SMS gateways		
4.2	REST/SOAP APIs and webhooks support		
4.3	Web Service APIs for third-party application interface		
4.4	Shall support Security & Compliance Requirements		
4.5	Role-based access with audit trails		
4.6	Backup and disaster recovery capabilities		
5	**Performance & Scalability Requirements**		
5.1	Scalable for large user bases and concurrent sessions		
5.2	High availability and load balancing support		

(h) UPS: 1KVA

Sr. No.	Parameter	Specification	Complied? (Y/N)	Remarks/ Deviations
1.	UPS Type	Line-Interactive, Plug & Play		

Sr. No.	Parameter	Specification	Complied? (Y/N)	Remarks/ Deviations
2.	Rated Capacity	1000 VA / 600 Watts		
3.	Input Voltage Range	140V – 300V AC		
4.	Input Frequency	50 Hz ± 10%		
5.	Output Voltage	230V ± 10% AC		
6.	Output Frequency	50 Hz ± 1 Hz (on battery)		
7.	Waveform (Battery Mode)	Simulated Sine Wave		
8.	Transfer Time	Typically, 2–6 ms		
9.	Battery Type	Sealed Maintenance-Free (SMF) Lead Acid		
10.	Battery Capacity	Sufficient to provide 15 minutes backup at 50% load (~300W)		
11.	Recharge Time	6–8 hours to 90% capacity		
12.	Indicators	LED indicators for Power On, Battery Mode, Fault, and Charging		
13.	Protection Features	Overload, Short Circuit, Battery Overcharge, Deep Discharge		
14.	Communication Interface	USB/RS232 (optional SNMP support)		
15.	Audible Alarms	Battery Mode, Low Battery, Overload, Fault		
16.	Operating Temperature	0°C to 40°C		
17.	Humidity	0% to 90% RH (non-condensing)		
18.	Form Factor	Tower		
19.	Certifications	BIS, CE, ISO 9001		
20.	Warranty	5 Years (UPS) / 1 Year (Battery)		

(i) Online UPS: 10KVA

Sr. No.	Parameter	Specification	Complied ? (Y/N)	Remarks /Deviation
1.	UPS Type	Online Double Conversion		

Sr. No.	Parameter	Specification	Complied ? (Y/N)	Remarks /Deviation
		(VFI-SS-111)		
2.	Rated Capacity	10 KVA / 10,000 VA / 10,000 Watts		
3.	Input Voltage Range	176V–280V (Line-Neutral), 305V–485V (Line-Line)		
4.	Input Frequency	40–70 Hz		
5.	Input Power Factor	≥ 0.99 (with full linear load)		
6.	Output Voltage	230V AC (adjustable to 220/230/240V ±1%)		
7.	Output Frequency	50/60 Hz ± 0.1%		
8.	Output Waveform	Pure Sine Wave		
9.	Efficiency	Up to 96%		
10.	Crest Factor	3:1		
11.	THD (Output Voltage)	< 1% (linear load), < 3% (non-linear load)		
12.	Overload Capacity	105% continuous, up to 155% for short durations		
13.	Battery Type	Sealed Maintenance-Free (SMF) Lead Acid		
14.	Battery Voltage Range	288Vdc – 480Vdc (±12 to ±20 batteries of 12V)		
15.	Backup Duration	30 minutes at 100% load (requires appropriately sized external battery bank)		
16.	Recharge Time	4 hours to 90% capacity		
17.	Charger Capacity	Up to 10 Amps (selectable from 1A to 10A)		
18.	Form Factor	Rack/Tower Convertible (3U rack size)		
19.	Display	Auto-rotating LCD with real-time status and parameters		
20.	Communication Interfaces	RS485, SNMP (optional), Dry Contact, SMS Alerts		
21.	Environmental Conditions	Operating Temp: 0°C to +40°C; Humidity: 0–95% RH (non-condensing)		
22.	Protection Features	Over Voltage, Dust Filter, Conformal Coating, Emergency Power Off (EPO)		
23.	Certifications	EN/IEC 62040-1, IS 16242:2014, EN/IEC 62040-2, IEC 62040-3		
24.	Warranty	Typically 5 years (UPS); 1 year (Battery)		

(j) Wall Mount Network Racks

S.No.	Feature	Requirement	Compliance (Y/N)	Remarks / Deviations
	Standards			
1	Equipment	Compatibility with all equipment conforming to DIN 41494 (General industrial standard for equipment)		
2	Mounting Rails	EIA-310-E compliant equipment mounting rails		
3	Finish	Powder coating meeting 7 tank ASTM standard		
	Construction			
4	Main Frame Construction	Welded		
5	Mounting profiles	Wall Mount Slots on Rear		
6	Front Door	Toughened glass surrounded bya metal frame		
7	Rear Door	Metal Panel with Wall Mount Slots		
8	Door Lock & Key	Front Door		
9	Side Panels	Plain solid side Panels, each side with Slam Latch, Lock & Key		
10	Top Panel	Vented Top Panel with Fan fixing provision		
11	Rack Width (mm)	550, 600		
12	Rack Depth (mm)	600		
13	Height Range	12 RU		
14	Color	Black / Grey		
15	Equipment Mounting Rails	Two Pairs		
16	Mounting Rails Holes	10mm Square punch		
17	Load Capacity	40Kgs Max		
18	Cable Entry Provision	Top Panel and Bottom Panel		
	Accessories			
19	Mounting Hardware	M6 Cage Nuts (Pack of 20)		
20	Top Panel Mounting Fans	Set of 2		

S.No.	Feature	Requirement	Compliance (Y/N)	Remarks / Deviations
21	Fixed Shelf	1No 250mm Deep 1RU		
22	Grounding Bar	19” Rack Mount, Horizontal		
23	Power Bar	2RU Horizontal, Indian type 6 x 5/15Amp Sockets with 2Mtr power cord open end		

(k) Floor Standing Equipment Rack

S.No.	Feature	Requirement	Compliance (Y/N)	Remarks / Deviations
	Standards			
1	Equipment	Compatibility with all equipment conforming to DIN 41494 (General industrial standard for equipment)		
2	Mounting Rails	EIA-310-E compliant equipment mounting rails		
3	Finish	Powder coating meeting 7 tank ASTM standard		
	Construction			
4	Main Frame Construction	Welded		
5	Mounting profiles	4 x 19” adjustable universal (heavy-duty)		
6	Front Door	Toughened glass surrounded with a metal frame		
7	Rear Door	Dual Perforated door		
8	Door Lock & Key	Front Door and Rear Door		
9	Side Panels	Plain solid side Panels, each side with Slam Latch, Lock & Key		
10	Top Panel	Vented Top Panel with Fan fixing provision		
11	Width	800 mm		
12	Height	42 RU		
13	Depth	1200mm		
14	Color	Black Powder coated		
15	Equipment Mounting Rails	Two Pairs		
16	Mounting Rails Holes	10mm Square punch		

S.No.	Feature	Requirement	Compliance (Y/N)	Remarks / Deviations
17	Load Capacity	750Kg with Castors / 1250Kg with Levelers or Plinth		
18	Heavy Duty Caster Wheels (Optional)	Set of 4 (2 Nos. with brakes and 2 Nos. without brakes)		
19	Cable Entry Provision	Top Panel and Bottom Panel		
	Accessories			
20	Mounting Hardware	M6 Cage Nuts (Pack of 20)		
21	Top Panel Mounting Fans	Set of 4		
22	Fixed Shelf	400mm Deep 1RU		
23	Grounding Bar	19” Rack Mount, Horizontal		
24	Power Bar (PDU)	Vertical with minimum 2 PDUs per Rack, each having minimum 5 Indian type 5/15 Amp Power sockets.		

(l) Passive Cabling

(a) CAT6 UTP Cable

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Type	Category 6 Unshielded Twisted Pair 4 pair cable shall be compliant with ANSI/TIA/EIA-568-2-D Additional Transmission Performance Specifications for 4-pair Category 6 Cabling IEEE 802.3bt PoE Applications. The Cable should be tested by a third party up to 650 MHz, and a report should be submitted along with the bid.		
	a)	Category 6 UTP cables shall extend between the work area location and its associated telecommunications closet and		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
		consist of 4 pairs, 23 AWG, UTP.		
	b)	Supports ultrahigh speed data networks such as Gigabit Ethernet (1000 Base-T and 1000 Base-TX) and beyond.		
2	Jacket:	Jacket LSZH and should comply with LSZH 332.1, IEC 60754-2, and IEC 61034-2		
3		Incorporates central spine (HDPE) maintaining pair separation during installation to ensure premium performance after installation.		
4	Mechanical Characteristics	Construction: 4 twisted pairs separated by internal X-shaped, 4-channel, polymer spine / full separator(HDPE). Conductor Solid Copper Conductor Diameter 0.56±0.005mm (23 AWG) Insulation: Polyolefin/polyethylene Outer Diameter 6.0±0.3mm Operation Temperature range -20°C to 75°C		
5	Electrical Characteristics	DC Resistance : 9.38Ohm/100m DC Resistance Unbalance: Less than 5% Capacitance Unbalance : 330PF/100m Mutual Capacitance: 5.6nF/100m Delay Skew: 536ns/100m Worse Case Cable skew: 45ns/100m Impedance : 100 Ohm +/- 15 NVP: 69% Dielectric Strength: 1.5KV AC / 2.5KV DC		
6	ROHS/ELV	Compliant		
7	ETL Certificate	Cat6 Cable should have been tested by ETL @650 MHz. TEST report should be submitted along with bid.		
8	Packing	305mtr Roll in pull Box		
9	Marking	Sequential marking at every		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
		one meter		
10	Colour	Grey		
11	Country of Origin	Make in India		

(b) CAT6 Jack Panel

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Type	19” 24-port, fully loaded patch Panel, Shielded Ethernet applications. Offering front labelling options, Rear Cable management bar. The patch panel is constructed of cold-rolled steel for additional strength and durability.		
2	Mounting standards	EIA 310-D 19” Rack Standards		
3	Patch Panel Material	CRCA, Thickness: 1.2mm		
4	Ports	24		
5	Panel Type	Discrete, individual port fixing and removable option		
6	Cables Management	Rear Cable Management bar to hold and support terminated cables		
7	Front Connector interface provision	CAT6A Keystone RJ45 Shielded / unshielded or both in same panel		
8	Port Identification	Individual port numbered from 1 to 24 ports on front panel with screen printing		
9	Port labeling	Panel should have space provision on front panel on top of each port to do labelling as per customer requirement.		
10	Height 1 U	(1.75 inches)		
11	Colour	Black Powder coating		
12	Country of Origin	Make in India		
13	ROHS/ELV	Compliant		

(c) CAT6 Information Outlet

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Type	Cat 6 Keystone Information outlet 8P8C, Unshielded		
2	Standards	Meets and exceeds ANSI/TIA-568.2-D and ISO/IEC-11801 Standards Meets and exceeds the requirement of IEEE802.3bt Power Over Ethernet (PoE, PoE+ and PoE++) applications		
3	Cable Termination	IDC		
4	Plug Insertion	> 1000 mating cycles		
5	Plastic Housing	Polycarbonate, UL94V-0 rated or equivalent		
6	Contact Area	50µ Gold Plated above Nickel		
7	IDC Acceptance	22-26AWG Solid cables		
8	IDC Contact Plating	100µ Nickel Plated over Phosphor Bronze		
9	Colors	White, Yellow, Blue, Green, Black, Red		
10	ETL Certificate	Cat6 4-connector channel test by ETL, TEST report should be submitted along with bid.		
11	ROHS/ELV	Compliant		

(d) Face Plate

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Product Type	Face Plate fits with single gang dimension(mm): 86X86		
2	Design	Single gang 2 Piece (Base plate and cover) modular design.Mounting screws should not be visible.		
3	Standards	Meets and exceeds ANSI/TIA-568.2-D and ISO/IEC-11801 Standards		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
4	Face Plate Material	ABS		
5	Port compatibility	Keystone		
6	Port Acceptance	Shielded/Unshielded 8P8C RJ45 information outlet/ connection modules		
7	Dust Protection	Spring shtter		
8	Fire rating	UL94V-0 rated		
9	Port Density	Should be available in 1, 2, and 4 port combinations		
10	Port Identification	Provisioned with Transparent label holder		
11	Accessories	Supply with mounting screws and hardware		
12	Color	White		
13	Country of Origin	Make in India		
14	ROHS/ELV	Compliant		

(e) CAT6 UTP Patch Cord

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Type	Cat 6 U/UTP Patch Cords are designed to support data networks for 10/100BASE-T and 1000BASE-T applications.		
2	Standards	Meets and exceeds ANSI/TIA-568.2-D and ISO/IEC-11801 Standards. Meets and exceeds the requirement of IEEE802.3bt Power Over Ethernet (PoE, PoE+ and PoE++) applications		
3	Conductor	24/7 AWG stranded copper wire		
4	Insulation	PE		
5	Separator/ Cross filler	PE		
6	Length	As per bidder’s design		
7	RJ45 plug and boot material	Clear polycarbonate UL94V-0		
8	Outer Sheath	LSZH		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
9	Patch cable OD	5.9mm +/- 0.3mm		
10	RJ45 plug dimensions compliant with	ISO/IEC 60603-7-4		
11	Contact material	50µ Gold Plating		
12	Bend radius control	Transparent Boot		
13	MIN operating life	> 1000 times insertion cycles		
14	ROHS/ELV	Compliant		
15	ETL Certificate	Cat6 4-connector channel test by ETL, TEST report should be submitted along with bid.		
16	Colours	Grey, Blue, Yellow, Green, Black		
17	Lengths	Should be available in 0.5m, 1m, 2m, 3m, 5m, 10m also tailor-made lengths as per standards and site requirements		
18	Country of Origin	Make in India		

(f) CAT6 RJ45 Field Terminable

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Type	Category 6 RJ45 Field Terminable Plug (MPTL), Unshielded		
2	Standards	Meets and exceeds ANSI/TIA-568.2-D and ISO/IEC-11801 Standards Meets and exceeds the requirement of IEEE802.3bt Power Over Ethernet (PoE, PoE+ and PoE++) applications		
3	Cable Termination	IDC		
4	Plug Insertion	> 750 mating cycles		
5	Plastic Housing	Polycarbonate, UL94V-0 rated or equivalent		
6	Contact Area	50µ Gold Plated above Nickel		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
7	IDC Acceptance	22-26AWG Solid cables		
8	IDC Contact Plating	100µ Nickel Plated over Phosphor Bronze		
9	Colors	White, Yellow, Blue, Green, Black, Red		
10	PCB	FR-4, UL94V-0		
11	ROHS/ELV	Compliant		

(g) OFC Cable

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Cable Type	6/12 fiber Multi Mode, Armoured, Loose-tube, Gel filled cable complying to ISO/IEC 11801-1, EN50173, ANSI/TIA 568-D.3; ITU-T G.651.1, TIA/EIA 492AAAF and IEC60793-2-10 A1a.2a suitable for use in outdoor ducts and backbone cabling		
2	Fiber Type	Multi Mode, 50/125 micron, UV curable Acrylate coated above the claded fiber, OM3 (IEC 60793-2-10 A1a.2 and ITU T G651.1)		
3	Armour	Electrolytic chrome-coated steel Tape Armour of min. 0.15 mm thickness		
4	Cable Construction Type	Telcordia GR 20, IEC 60794-1-2E1, E2, E3,E4, E6, E7, E11, F1 and F5		
5	Fiber identification	Each fiber strand must be color coded in the sequence as per TIA 598-C standard:		
		Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Rose, and Aqua.		
6	Attenuation	@ 850nm <=3.5 dB/Km MAX		
		@1300nm <=1.5 dB/Km MAX		
7	Loose tube material	Single PBTP Loose tube filled with water blocking Thixotropic gel		
8	Loose tube diameter (Nominal)	2.0 ± 0.10 mm		
9	Jacket material	High Density Polyethylene outer jacket		
10	Water Blocking	Water Swellable Peripheral		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
	Material	Tape/Glass yarn		
11	Tensile Strength	2000 N or better		
12	Crush Resistance	1500 N/m or better		
13	Cable Diameter	7.5 +/- 0.3 mm		
14	Min Bend Radius – Installation (mm)	150 or better		
15	Min Bend Radius – Service (mm)	75 or better		
16	Cable weight Kg/Km	100 ± 10%		
17	Operating Temperature	-20 Degree C to +75 Degree C		
18	Test Reports	OEM factory test reports must be provided against each drum/roll of fiber cable.		

(h) Rack Mount LIU

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Fiber Management shelf	The fiber management shelf shall have compact design and be ideal for high density front patching applications.		
		Should be a fully loaded and factory fitted assembly with no assembling required during installation at site		
		• High Density: 1U: up to 12/24Fiber terminations		
		• The supplied LIU should be fully loaded with SC/LC duplex adapters, Pigtails, splice trays, and fiber management provision		
		• Min 4 round cable entry points at rear of shelf		
		• Easy slide-out telescopic movement Panel		
		• Modular 4 cut out type with adapter plates, and easy to choose the type of connector, SC/LC, or mix and match combination of adapter plates		
2	Drawer style shelf	o Easy access to splicing tray and connectors		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
		o Should have front easy locking mechanism on both sides of shelf		
3	Accessories	Fiber management guides, secure tie downs preinstalled.		
		Shall be supplied with splicing trays and Fusion splice protection sleeves		
		Provision for Labeling and Grounding		
		Sealed cable inlets for dust and rodent protection		
4	Material	Min 1.2mm CRCA Sheet steel with powder coating		
5	Fiber / buffer tube storage	Min of 280 mm depth		
6	Pigtails loaded in Shelf:			
I	Type	SC/LC Type, MM (OM3) 900 micron Pigtail		
Iii	Attenuation	<=0.2 dB, at 1300 nm		
III	Return Loss	>= 35 dB		
IV	Ferrule	Zirconia Ceramic		

(i) LC – LC OFC Patch Cord

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
1	Make and Type	LC/UPC to LC/UPC Duplex tuned Fiber Optic Patch Cord,50/125 Micron		
2	Standard	ITU-T G.651.1 Multimode OM3 Fiber, TIA FOCIS 10 for LC connector, TIA FOCIS 3 for SC Connector		
3	Cable Sheath	LSZH		
4	Cable Jacket Color	Aqua		
5	Strength Member	Aramid Yarn		
6	Cable Diameter	1.8 +/- 0.1mm		
7	Flame test compliance	IEC 60332-1, IEC 61034-2 and IEC 60754-2		
8	Connector Ferrule	Zerconia Ceramic		
9	Connector Polishishing	UPC		
10	Connector	Aqua/Beige		

S.No.	Feature	Requirement	Compliance (Yes/No)	Remarks, if any
	Housing Color			
11	Cable Retunsion Force	20N		
12	Insertion Loss	MAX 0.3 dB		
13	Return Loss	> 35 dB		
14	Temperature Range	-20 Degree C to +75 Degree C		
15	ROHS	ROHS 2011 Compliant		

21.3 Bill of Quantity

Sr. No.	Item Details	UoM	Qty
A	**Active Network Components**		
1	Core Switch: 48 x 1G/10G SFP+ and 4 x 40G/100G QSFP28, Redundant Power Supply & Fans	Nos.	2
2	Access Switches: 24 x 1G RJ45 PoE+ Ports, 370W PoE Power	Nos.	27
3	Wireless AP - Indoor Dual Radio 4x4 802.11ax Internal Antennas	Nos.	191
4	Wireless LAN Controllers	Nos.	2
5	Licenses for Wireless LAN AP	Nos.	191
6	Network Access Control (NAC) - Physical or Virtual Appliance including 600 User License for AAA/RADIUS Authentication & Access	Nos.	2
7	Network Management System for LAN & Wireless Management, Configuration, Monitoring for minimum 250 network devices (switches, Wireless controllers & AP).	Set	1
8	1G and 10G Optical & Electrical Transceivers for Switches	Lot	As per Requirement
9	ITSM/Helpdesk Tool with 5 technicians	Set	1
10	Server Hardware for NAC, ITSM/Helpdesk tool as per compute & storage requirement	Lot	1
11	Server OS & Hypervisor - as per requirement	Lot	1
B	**Passive Cabling Components, Racks & UPS**		
12	CAT6A Patch panels (Loaded)	No	28
13	Fiber Management System 12port	No	13
14	Fiber Management System 24port	No	8
15	Fiber patch cords (3mtr)	No	280
16	42 U Racks (800 x 1000)	No	13
17	CAT6A cable (305 Mtr)	Mtrs	47275
18	IO box & Face plate	No	525
19	Information Outlets	No	525
20	6 core Armed Fibre cable	Meters	1300
21	32mm HDPE Pipe	Mtrs	700
22	Cable Managers	No	50
23	2" Casing capping	Mtrs	2600

24	2.5" PVC Duct with accessories	Mtrs	1800
25	12U Wall Mount Rack	Nos	12
26	42U Floor Standing Rack with 8 port KVM Switch & LCD Console	No.	1
27	Any other Items as required for completion of successful installation & commissioning	Lumpsum	As per Requirement
28	UPS - 10 KVA online with 30 min Battery Backup	Nos.	2
29	UPS - 1 KVA Line Interactive with 15 min backup for Access Switch Locations	Nos.	12
C	**Service Costs for One-time implementation, commissioning, testing**		
30	One-timeImplementation Cost for Active Network Components & Servers	Lot	1
31	One-timeimplementation Cost for passive Cabling Components & UPS	Lot	1
D	**Facility Management Service/Manpower Resource for 1 Years**		
32	1 x L1 Onsite Resource	Nos.	1
33	1 X L2 Onsite Resource	Nos.	1